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THE IRON AGE

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Allegheny Metal is
immune to corrosive
effects of weather

FABRICATION NEWS

Good for a
Lifetime—Bright
for an Age

FROM STAINLESS STEEL HEADQUARTERS—ALLEGHENY LUDLUM, OF COURSE!

1938 MARKED REAL PROGRESS IN WELDABILITY OF STAINLESS STEELS

THE rapidly increasing use of the stainless steel alloys in structures fabricated by welding has been accompanied by a constantly increasing knowledge of the various processes of welding and of their effects on these alloys. This was particularly true in 1938.

The Allegheny Ludlum Steel Corporation recognized years ago in its pioneering days that the ultimate in the fabrication of welded structures was the preservation to the fullest possible extent of all the corrosion-resistant and physical properties inherent in Allegheny Ludlum alloys "as shipped from the mill"—those qualities that lead to the initial selection of an alloy for a given application.

Because of its important position as a producer of stainless alloys and because so large a proportion of its production goes to the ultimate user in welded condition, Allegheny Ludlum has continued to hold the lead in the study of the practical phases of welding as applied to these alloys. This has been accomplished through years of organized research and collaboration with fabricating customers.

Noteworthy among recent activities have been the following:

1. Investigation of the relationship between choice of alloys (stabilized or unstabilized), construction, methods of welding, and general size and design of the unit involved, together with consideration of the question as to whether or not to anneal for stress-relief or for carbide solution.

2. Effects of various compositions in the welding rod, so far as physical values are concerned, and the relation between these and the combined chromium and nickel contents.



3. The welding of the ferritic alloys wholly or in part with chrome-nickel alloy welding rods in the interest of ductility, and the use of this method on vessels intended for service in various temperature ranges.

The remarkable development of modern welding processes in recent years has been coincident with the development of the stainless steels. Alternately, the one development has provided an incentive to the other. They have developed together.

Allegheny Ludlum, therefore, stands ready to render thorough



technical assistance to users of its alloy products on applications involving welding.

ALLEGHENY LUDLUM
STEEL CORPORATION
WAREHOUSE STOCKS  PITTSBURGH, PA.
IN PRINCIPAL CITIES
"Steels of Today and Tomorrow"

... THE IRON AGE ...

FEBRUARY 23, 1939

ESTABLISHED 1855

Vol. 143, No. 8

Sound American Doctrine

... We are firmly convinced that various forms of government spending, either in the distribution of relief or in the development and maintenance of work projects designed to supply relief wages to unemployed, can only serve as temporary measures and cannot and do not provide a permanent solution for unemployment.

... We do not believe that the nation has reached the maximum in production or consumption of manufactured goods. For that reason we cannot accept the reasoning of those who maintain that we must prepare to maintain constantly an army of unemployed as the wards of the government. We must turn to private industry for the solution. It should and must serve the nation.

... Our national interests require that private industry be accorded the widest opportunity to do so. That involves expansion and an increase in productivity. Such action must be considered as the primary step necessary to create work opportunities for the millions who are unemployed. Obviously, the next step must be the establishment of credit and the will and purpose, on the part of the owners of industry to risk, invest, build and construct. The basis for such procedure must be found in the creation of a favorable state of mind. Fear, a lack of confidence and distrust in governmental, social and economic procedure should be removed. A political and economic state of mind should be created which would

enable all financiers and the owners and management of industry to face the future with confidence, willing to risk in the expenditure of funds for the development of industrial enterprises and in the manufacture and sale of manufactured products.

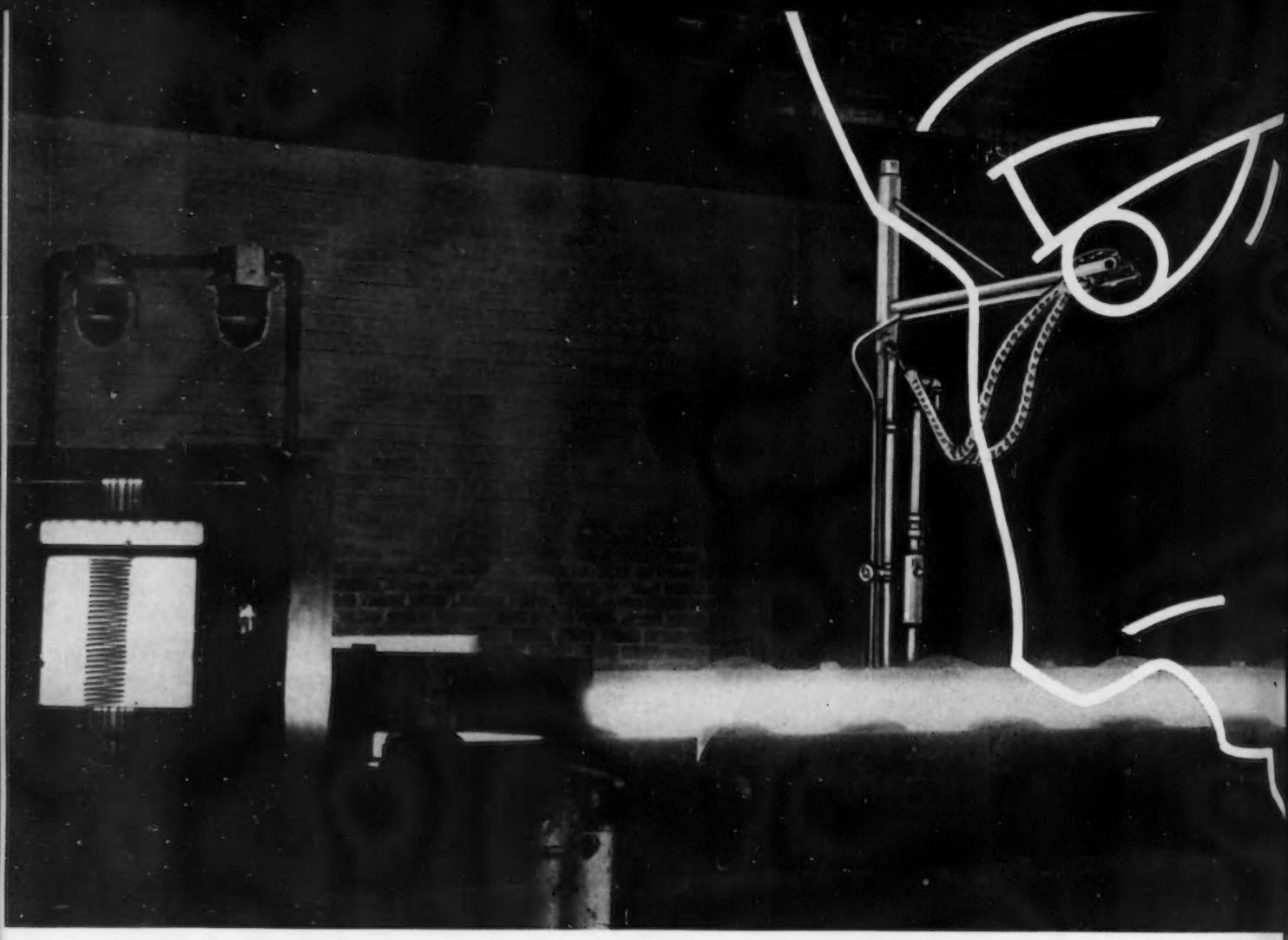
... Whatever barrier may have been created, either as a result of fear or as a result of affirmative action on the part of those who administer the affairs of government, ought to be broken down so that our industrial processes may function in a proper way and unemployment may thus be overcome.

... This issue should be met squarely. All should understand that no new rules or stipulations will be promulgated by some administrative bureau other than the rules and regulations definitely set forth in regulatory statutes enacted by the Congress of the United States. Such action will serve to help business, labor and the people generally. Under such a plan industrial management would be accorded the widest opportunity to render service in the solution of our unemployment problem.

... We believe that private initiative, private investment and private endeavor in private industry should be encouraged and supported. We assert that those who invest in private industry should earn a fair return upon such investment and that labor should be paid a wage which would accord to all workers and their families an opportunity to live in decency and comfort.

THESE words are not an original expression of THE IRON AGE, although we would be proud to have written them. They are from a statement made last week by the executive council of the American Federation of Labor. When American labor and management see eye to eye and work shoulder to shoulder together for the betterment of American business, we can look for prosperity to come at last around that much publicized corner.





THE MAGIC EYES OF INLAND'S CONTINUOUS STRIP MILLS

They "see" the temperature of the steel being rolled and keep records that aid in maintaining greater uniformity of quality.

It's true. Modern continuous strip mills can have eyes that see, and record what they see automatically.

These magic eyes *see heat*. Their vision includes every inch of hot strip that passes through Inland's 44" and 76" strip mills. Located both at the entering and finishing ends of each mill, these automatic pyrometers read and record the entering and finishing temperatures of all steel rolled, aiding skilled heaters and rollers to maintain proper temperature conditions so necessary to high quality strip production.

The extreme sensitivity of these electrical eyes is derived from the photo-electric cell . . . the nerve center of modern television, the photographer's light meter, the tireless night watchman that sets off an alarm when a thread of light is broken . . . and is constantly finding new uses in industry.

This application of the "electric eye" to modern steel making is typical of many important control devices now being used to assure higher quality and greater uniformity of all Inland sheets, strip and other rolled steel products. Whatever properties you may require of steel, you will find Inland men both well equipped and prompt to cooperate in securing them for you.

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38 South Dearborn Street, CHICAGO • District Offices: DETROIT • KANSAS CITY • MILWAUKEE • ST. LOUIS • ST. PAUL

SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

LOOK...

Before You're Struck

(Anonymous)

NO responsible person wants a strike, whether he is an employer, an employee or a stockholder. And in these times of enlightened management and enlightened labor organizations there should always be some way of settling disputes which does not involve empty pay envelopes and darkened stacks. In strikes, as in wars, the fruits of victory frequently are bitter.

Thus, modern management will usually go more than half way to avoid a strike. When, under one-sided legislation like the Wagner Act, industrial disputes are fanned and Government agencies seem to encourage strikes, management has no choice but to do its best to help the business survive. It is with this somewhat desperate area of "last resort" that the accompany article, written by the general manager of a large manufacturing company who must remain anonymous for obvious reasons, is concerned.

• • •

AT one time strikes were considered a disgrace to a company—a black spot on its record. An institution's strike record was carefully investigated before a sizable amount of credit was extended to the firm. Moreover a reputation for strikes was always an important item when placing contracts with outside concerns for parts used in assemblies at the home plant.

It used to be said that a strike would never develop in a company where proper employee relations have been maintained. In fact any kind of labor trouble was regarded as evidence that something was wrong with the plant's labor policy.

But this was before the National Labor Board was established by the very law whose preamble recites as its purpose the elimination of strikes. As long as the decisions of the Labor Board seem to be based upon disrupting satisfactory industrial relations and promoting organized labor regardless of the circumstances and as long as the Supreme Court rules that a strike can be called and picketing

established even where no labor controversy exists, then strikes become the rule rather than the exception. It can no longer be a disgrace to have a strike. As a matter of fact managements of other plants may have a feeling of sympathy for a company undergoing labor difficulties.

Then Come the Agitators

Many concerns have spent vast sums of money in personnel work and have had the last word in good industrial relations only to have the whole work destroyed by ambitious agitators. Thus a strike is no longer any indication of the kind of labor policy in effect in the plant. Indeed some companies who have maintained the worst employee relationships have experienced no trouble as yet only because the radicals have not had an opportunity to get around to their locality up to this time.

Without question it still is desirable and the better part of wisdom to prevent labor troubles from progressing to the point of a strike in the large majority of instances. Nevertheless not infrequently labor's demands become so unreasonable that manage-

ment must consider whether it can afford to have a strike or whether it must accede to the demands regardless of their proportions.

All too often, however, management allows things to progress to a strike without ever considering the cost of such a shutdown and whether the finances of the institution are capable of withstanding the strain. Moreover many times strikes are called upon little provocation and have come as a great surprise to the management of the enterprise.

Figure Costs in Advance

Thus it behooves the officers of every company to determine what should be done in case a strike is called at the plant and what the cost would be. More strikes are won before they are called than afterward; that is to say, planning done prior to a strike does more toward the eventual favorable outcome than anything that can be done during its progress. We are not referring to storing up ammunition and supplies in the plant. Rather it is being suggested that carefully laid plans be worked out as to just what would be done in the event

of a strike. Obviously if a concern is too weak financially to see a strike clear through, it should never go into one for a short time and then have to yield to the demands of the strikers. In every such case a better settlement could have been made before the strike commenced.

A study of what to do in attempting to carry on a business when a strike is called and the expense thereof is not dissimilar to laying plans for getting into operation again in the event the plant is destroyed by fire. Without question strikes are very expensive to the business.

Owing to the wide variety of industries little can be said of a specific nature as to what can be done under strike conditions. If more than one plant is operated by the concern, this greatly simplifies strike troubles particularly if they are widely separated. Some companies in fact have established branch plants for the sole purpose of eliminating dependence upon labor. However, in not a few cases strikes have been called lately at all of the plants of a particular company.

The type of product manufactured of course has an important bearing on the cost of a strike and what can be done during its progress. If the company manufactures a patented product on which it holds a monopoly, there is little chance for getting the work done outside, particularly if special machinery is necessary for its manufacture.

Reputation at Stake

A company in the business of rendering service to other institutions such as supplying them with parts is in a more difficult situation insofar as strikes are concerned than a plant manufacturing a product for the wholesale or retail trade. When many other plants are dependent upon service from the company in question, that service cannot be suddenly interrupted without serious consequences to reputation for service.

In addition the length of time orders are in process in a plant has an important bearing on the costs of a strike and what to do during its progress. If a product is manufactured where ordinarily deliveries are long, a strike of a month or more can be endured possibly without any attempt to continue production. On the other hand where orders are usually completed within a few days, something must be done about them immediately when a strike is called.

Those concerns who manufacture goods for dealers stocks, such as the

automobile companies, are particularly fortunate in being able to undergo a strike without production for some period.

What must be done in the case of a strike depends also upon the measure of police protection afforded in the particular locality. If operation of the plant by those employees who wish to work is possible, there are fewer problems in keeping the business going. But such a situation is rarely possible unless violence is resorted to and whether the fight is to be carried to

Looking on the Brighter Side For the Strike-Bound Manager

ANY non-operating income which the company enjoys will serve to reduce the expense of a strike, because the non-operating income continues regardless of the idleness of the plant. For example, if excess property not required for manufacturing is rented to outside concerns, this rental will continue. Likewise other income such as dividends and interest on stocks and bonds owned will continue."

these proportions or not is a decision that must be made by the management itself.

Prepare Outside Office

Next best to being able to operate the plant on the basis of curtailed personnel is the ability to gain access to the plant and to make shipments from warehouse stock. But perhaps in the majority of instances the strikers have not permitted access even to the office, and the police have offered no protection against this violation of the rights of owners of property. Any plans for procedure during a strike should probably anticipate the worst condition and should assume that it would not be possible to get into the office.

This means renting a new office space preferably in a downtown building where picketing is not probable. Some companies have taken the precaution of keeping in touch with available spaces and their cost. Desks must be rented as well as typewriters.

Service to customers during a strike is the important consideration. In many cases companies have talked the situation over with their competitors in the same industry and have arranged to secure goods from them to

supply orders during the shutdown. If the industry is such that this can be done, a strike can be maintained almost indefinitely by proper planning.

Establishing a Warehouse

In some instances it has been found desirable to establish a warehouse or shipping point from which goods can be received from the competitor and reshipped without divulging the name of the customer to the competitor. This may be established at the competitor's city or at a more central location. Whether or not it pays to have the company's shipping clerks to do this is determined by comparing the cost with the expense of having a public warehouse or forwarding company perform the same services. Of course the warehouse rent and traveling and living expenses of the shipping personnel should be added into the cost of strikes.

Costs connected with a strike may be divided into two classes. Tangible and intangible. Perhaps the most important of the intangible costs is the possible reaction against the sale of the product. At the time the writer attended law school, he was taught that a secondary boycott was illegal. This is still part of the common law, but it seems to be inoperative at the present time. Consequently if your product is sold to the retail trade, particularly with a trade name or trade mark that can easily be identified, there is strong possibility of your suffering considerable losses due to the union's refusal to buy or install your product.

Loss of Customers

Another intangible cost of a strike is the loss of customers, never to be regained or at least not without considerable effort. When the regular source of supply is stopped suddenly, the purchaser must find a new source or a substitute product. The new product may be just as good and particularly if new tools have been made up by the new supplier, the business is difficult to get back again. Every sales manager knows the effort required to take business away from a regularly established source on an even basis.

A third intangible cost of a strike is the irreputable damage done to personnel relations. Frayed feelings and antagonisms are bred requiring many years for complete healing. Consequently strikes are always to be avoided whenever possible.

On the other hand there are some situations where strikes are necessary as a last resort to demonstrate to the

employees that there is a point beyond which their unreasonableness cannot go. While a strike is a terrific expense to the company, it must be remembered that it is also a heavy expense on the part of the workmen. Although the ability of workmen out on a strike to go on relief has eliminated this hardship on the part of the employees to a large extent and hence has tended to encourage strikes, there is still a large percentage of the workers in America who abhor being on relief and who want to earn their own living.

Wives an Influence

After employees have been on strike for a few weeks their wives begin to complain that no pay checks are being brought home, and the longer this continues the less workers are influenced by irresponsible labor leaders. In cases where a company has passionately thought out the consequences of a strike previously and has determined it was in a position to carry a strike through before going into the situation, then it is always exceedingly difficult to influence employees to vote a strike for many years thereafter.

The tangible costs of a strike consist of overhead that continues during any inactivity of the plant and additional expenses necessary to carry on sales activities of the company. The cost of a strike of course depends largely on the duration of the strike. If it lasts only a few days, there will be no additional expense except the continuing overhead. If the strike lasts longer than a week, something must be done about quite a few things and the longer the interruption occurs the more things require attention.

One of the principal items of continuing overhead expense is insurance. Insurance on the property must be maintained regardless of the operation of the plant. The same is true of maintenance expense on the property itself. Maintenance of equipment will, of course, be eliminated, but deterioration of roofs, skylights, etc., goes on just the same, and even though the actual repairs are not made during the progress of the strike, proper cost accounting demands that the expense be allocated to the period when the work was made necessary. Of course where the property is not owned but is rented under a lease, then the rent must be considered as a continuing expense.

Property taxes continue and must be paid, although income taxes do not accrue unless the company continues to make a profit during the strike. Power contracts should be examined to determine if there is a minimum

monthly charge whether energy is used or not. Heat will be necessary in the winter time to prevent damage to equipment, although it is hardly necessary to keep the plant at the higher temperature necessary for comfort to workmen unless, of course, some operations are being carried on. Other contracts should be examined to determine minimum charges if any. For example the agreement with the telephone company may provide for a minimum monthly charge.

The expense subject to the most con-

Secondary Boycotts Illegal In Most States and Yet . . .

"COSTS connected with a strike may be divided into two classes, tangible and intangible. Perhaps the most important of the intangible costs is the possible reaction against the sale of the product. At the time the writer attended law school, he was taught that a secondary boycott was illegal. This is still part of the common law, but it seems to be inoperative at the present time. Consequently . . . there is strong possibility of your suffering considerable losses due to the unions' refusal to buy your product."

trol is the item of wages and salaries. Generally it is planned to continue all monthly salaries for the reason that the services of most of those on a salary basis will be needed during the strike period. If sales activities are to be carried on, particularly, most of the office force will be busy. Some salaries in the supervisory force are continued for the reason that the individuals are so skilled or experienced in the business that it does not pay to take a chance on losing them to another organization. Then too the continuation of salaries through a strike period can be justified from the standpoint that interruption to production was no fault of the salaried workers.

Keep Key Men

The continuation of remuneration to hourly employees who are willing to work is a problem individual with each plant. Watchmen, firemen, and so forth will be needed for the proper protection of the plant. Often it is advisable to keep key men on the payroll, especially if there is anything they can do during this period. Pay-

roll taxes and workmen's compensation insurance, of course, will be reduced to the extent of the payroll curtailed.

If sales activities are carried on during the strike, then no change will occur in the sales expense. Commissions, traveling expenses, advertising, discounts and collection charges, and charges to bad debts will go on about as before.

Depreciation is an item of overhead expense which continues during a shut-down period and hence should not be overlooked. It is true that this is a non-cash charge which is to say no immediate outlay is necessary to cover the expense. Proper accounting requires depreciation to be included in the cost of a strike. Even where rates of depreciation vary according to units of production, depreciation still accumulates during idle periods because of obsolescence and other constant factors making up the general rate taken during normal periods. Then, too, depreciation on buildings and building equipment cannot vary with units of production and hence is unchanged due to idleness.

The new expenses to which the business will be subjected during a strike will depend upon the amount of activity it is planned to carry on. If attempts are made to take care of customers the same as when a strike is not in progress, it will possibly be necessary to rent sufficient office space to accommodate the executive and clerical force, rent desks, office furniture, and typewriters, furnish light, heat, and new telephone service. Desks and furniture rental ranges from 20 to 25 per cent of the selling price for the first month, 12 to 15 per cent for the second month, and a further adjustment for each successive month. Cheap desks can be obtained from \$30.00 to \$40.00 each, typewriter stands from \$7.00 to \$8.00 each, and chairs at about \$12.00. Typewriter rentals are around \$3.50 each per month.

Telephone Lines

New telephone lines would have to be provided at regular rental and installation charges. Unless the temporary office is located in the same exchange district as the original plant, it is hardly likely the telephone company can provide the same number, although in any event arrangements can be made for switching to the new number whenever the regular number is called.

Regular office expenses such as postage and stationery will be continued

(CONTINUED ON PAGE 37)

Finish Processing of Ordnance

NEW combination boring and honing machines, Fig. 8, have recently been developed to cover a wide range of applications in the manufacture of airplane parts, recoil cylinders, cylinder sleeves and other tubular parts. [See also p. 28 of the Jan. 12 issue.] The hydraulically actuated head feed for boring and honing contains an adjustable delivery gear pump and variable delivery feed pump. This unit permits jogging of the honing stroke at any point in the predetermined stroke, and facilitates the removal of any taper or out-of-roundness in the work. The feed mechanism is entirely independent from the drive, permitting an infinite combination of cutting speeds and feeds for boring, from approximately 0.002 to 0.065 in. feed per rev. of the spindle. The speeds available for honing will produce from 30 to 45 deg. of crosshatch. Fine, positive adjustment of this hydraulic unit permits the head to stop at the same position on the end of a reciprocating honing stroke within 0.002 in. tolerance.

Finishing "Oleo" Cylinders

In the first operation on airplane landing gear shock absorber strut or "oleo" cylinders, the cylinder is rough bored, as shown in Fig. 9. The head for this boring operation is fed away from the fixture, pulling the boring bar through the bore. Since the bore is small, limiting the boring bar diameter, the cylinder is located so that its deepest bore allows back or pull-boring, thereby eliminating compression forces on the bar while rough boring. After the rough boring of the shallow end, shown in the second operation, the cylinder is heat treated to 37 Rockwell C.

The semi-finish operations are performed with double bit boring tools, as shown in the third and fourth operations, as is the finish boring of the deep bore, shown in the fifth line.

The short bore cylinder does not require a high degree of finish. Con-

sequently the work is next turned end for end in the fixture, clamping on the ends instead of the outside diameter, and the deep bore is rough and finish honed as shown in the sixth and seventh operations. The honing cycle of the machine is adjusted so that a dwell is maintained when the tool is in its deepest position. This compensates for the overstroke on the open end and equalizes the amount of stock removal on the entire length of the bore.

IN the second and concluding part of the article that began in the Jan. 12 issue, the author describes some recently developed combination boring and honing machines for processing airplane and other tubular parts, particularly the so-called oleo

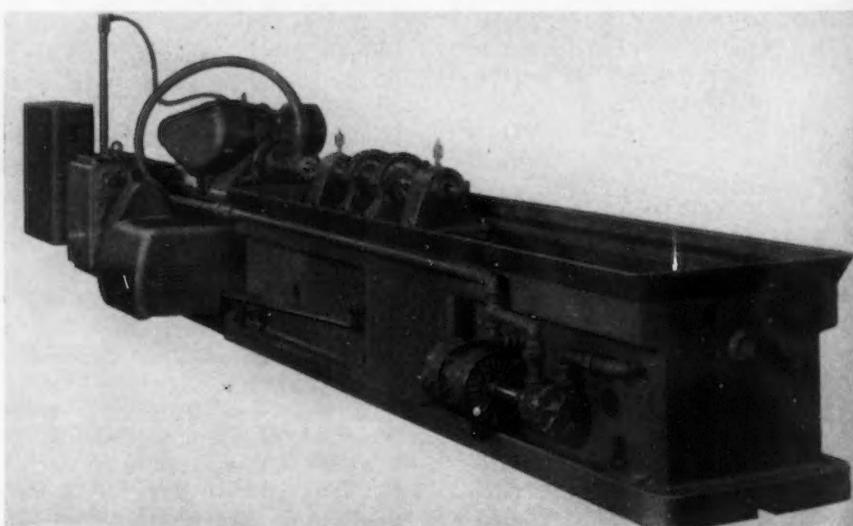
AT RIGHT

FIG. 9—Steps in combination boring and honing on landing gear "oleo" cylinders. Some forged steel anti-aircraft guns now are being processed with similar equipment.

• • •

BELOW

FIG. 8—In this combination boring and honing machine, hydraulic-actuated head feed for boring and honing contains adjustable delivery gear pump and variable feed pump, permitting jogging the honing stroke to facilitate removal of taper or out-of-round. This is a rear view, showing hydraulic feed unit at left.



And Tubing Bores--II

By KIRKE W. CONNOR
President, Micromatic Hone Corp.,
Detroit

landing gear cylinders. Operations on recoil and recuperator mechanism for ordnance are also discussed. Mr. Connor concludes his paper with details of a new industrial application of honing to finishing oil-well pump barrels that have been hard surfaced with X-alloy metal.

In some instances, forged steel anti-aircraft guns are now being processed for accuracy, final size, and surface finish, with honing tool equipment similar to that previously described. In one instance, a 1.1 in. diameter by 80 in. long bore was formerly lapped following a reaming operation, using expanding type copper laps, and requiring from 8 to 48 hr. to secure final finish. This operation was superseded by a single honing operation, removing from 0.003 to 0.004 in. stock,

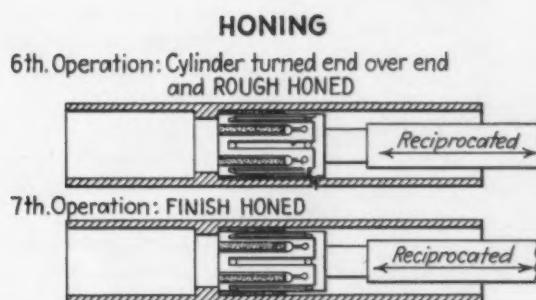
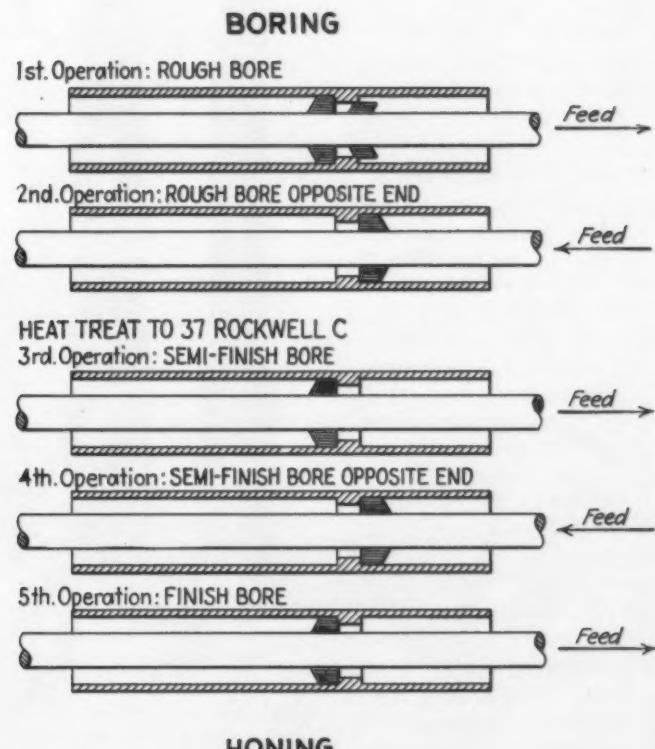
and securing accuracy, size and final surface finish in 22 min. actual honing time.

Other installations now impending comprise the use of the honing process for finishing small arms, carbine type bores, varying in diameter from 0.500 to 0.875 in. and from 30 to 36 in. in length. Other installations will shortly be made for similar processing on the forged steel automatic rifle type bores, shown in Fig. 10, removing an estimated 0.003 to 0.004 in. stock in bores of approximately $\frac{1}{2}$ in. in diameter by 37 in. long.

Regulator cylinders for recoil mechanisms, which range in size from 0.9450 in. diameter by 14 in. long to $1\frac{1}{2}$ in. by 20 in. long, and which contain two small keyways diametrically opposite to each other in the bore, are being finish honed in some arsenals with vertical spindle machines. Approximately 0.002 to 0.0025 in. stock is removed from these steel forgings in one operation following reaming, within accuracy of 0.00025 to 0.0003 in. for roundness and straightness, in approximately 8 min. honing time.

Blind-End Work

Airplane landing gear oleo cylinders of a somewhat different type than shown in Fig. 9 are being honed by the larger manufacturers both in the United States and abroad. The essential principle of the complete assembly is shown in Fig. 11. In many of these units, the telescoping cylinders in assembly are fitted with closed end plates by welding, or a combination of welding and threaded connection. In the United States, it is conventional practice to process these cylinders completely before the ends are closed up, suitable allowance being made in fixing the working stroke length of bearing to allow for any slight distortion caused in fabrication. In various installations abroad, these cylinders are finished in final processing after the end plates have been assembled, thus



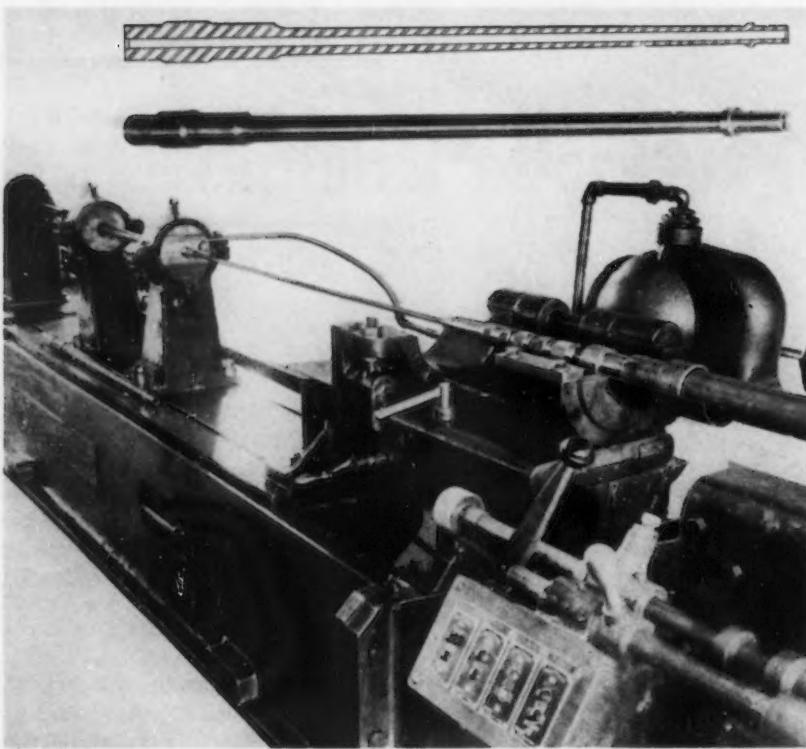


FIG. 10—Much has been heard of new automatic rifles. This machine is designed to remove 0.003 to 0.004 in. stock in 1/2-in. bores of forged steel.

requiring a processing method adaptable to a blind-end type of bore.

The tools used in these blind-end assemblies are of the mechanically actuated type with automatic spring feed expansion, and are so arranged that the complete tool enters the bore, being used in connection either with a driver alone or with a driver and intermediate driver.

The majority of these assemblies are of chrome-molybdenum steel, and are either bored or ground prior to final finishing. The honing operations remove approximately 0.001 to 0.0015 in. stock, generating accuracy for roundness and straightness within 0.0005 to 0.0007 in., depending upon the size and length of the bore, and producing a micro-finish which is within 5 to 10 micro-in. of true smoothness. The tools representative of present installations vary in size from 1.7 to 6.2 in. in diameter and from 20.7 to 56.3 in. in net honed lengths.

A large number of small diameter bores, from 1/4 in. and upward, in naval gun turret elevating control mechanism parts are also being finish processed by means of honing.

External Honing

The external surface of forged nickel steel piston rods, used in recoil and recuperator cylinders of lower

caliber artillery guns, is being honed and straight-line honed in the final finishing and reconditioning operations in some arsenals. Two such rods, 1 1/2 and 4 1/2 in. diameters respectively, by approximately 8 ft. long, are shown in Fig. 12, together with the mechanically actuated tools of the hand brake type, which are used in these applications. Working from a worn finish, stock is removed on the 1 1/2 in. diameter rod at the rate of approximately 0.020 to 0.030 in. per hr. On the 4 1/2 in. diameter rod, stock removal is at the rate of from 0.010 to 0.015 in. per hr. Accuracy of from 0.0001 to 0.0003 in. is easily obtainable. Micro-finish of 1.5 micro-in. profilometer reading, has been easily obtained. The principal advantages of external honing comprise better fitting of mating parts, decreased wear, and in hydraulic assemblies provide a better oil seal.

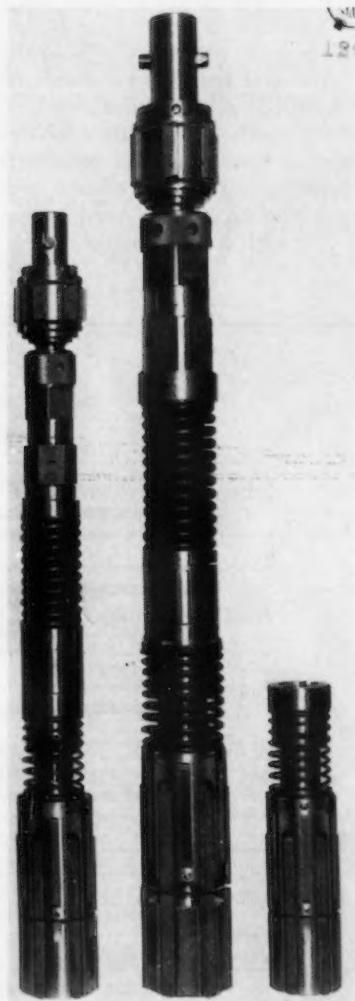
Some tapered shafts of 0.070 in. per ft. taper are also finished with similar equipment for surface finish only, the stones being arranged to follow the taper.

Hard Facing of Oil Pump Barrels

A very interesting industrial application has been developed in the oil well industry. This involves the finishing of oil well working or pump barrels which are lined with X-alloy metal, or boron iron, varying in hard-

ness from 800 to 1000 Brinell. This material is extremely resistant to abrasive wear and has substantially lengthened the life of pistons and pump barrels when working in the presence of gritty sludge, concrete, and similar materials. It is applied in powdered form, the powder being placed in a bore or tube, the ends of

FIG. 11—Blind end tubes frequently are used in this type of mechanically actuated scoping cylinders which are so processed are landing gear strut



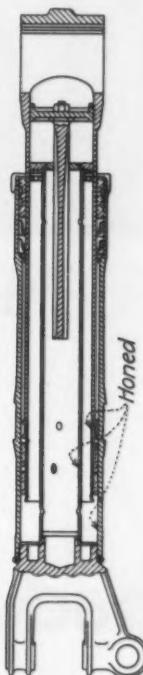
the tube closed or sealed, following which the tube is spun in an electric furnace at a very high rate of rotation, melting the powder, and causing the tube to become lined with the X-alloy metal.

One manufacturer has been experimenting for several years with the spinning of this metal in place in sections varying from 12 to 24 in. in length. Various mechanical difficulties were encountered in the control of thickness of the spun metal in these

long lengths, and a difficult problem of final processing was presented, due to excessive taper, excessive stock removal to generate concentricity and accuracy, and extreme constriction in various remote locations in the bore.

In the meantime, other manufacturers conceived the idea of spinning this metal in shorter lengths, following

processed for aircraft oleo tubes in Europe hone. The chrome molybdenum steel tele-indicated on the diagram of a complete assembly in the sketch.



which it could be easily and more economically processed for final finish, and the finished sections assembled into desired lengths on an arbor, clamping them in place by means of an outer casing, following which the arbor is withdrawn. The specifications established for this project comprise the assembly of from four to 24 sections of 12 in. length, or similar groups of 8 and 10 in. sections, into a complete pump barrel which must have a total accumulated error within 0.0009 in. (American Petroleum Institute Standard), and diameter size limit within 0.001 in. Working plungers from 48 in. to 60 in. long, with from 0.0005 to 0.005 in. clearance, are used in these barrels. It was desired to finish new sections approximately 0.030 to 0.040 in. undersize, and as soon as they were worn, to recondition them in steps of 0.005 in. until a maximum oversize of approximately 0.030 to 0.040 in. had been reached, following which the barrels were scrapped.

Hard Liners Now Honed

After this development had been adopted by several manufacturers, competitive enterprise prompted one manufacturer to seek the advantage of processing these pump barrel assemblies in the assembled lengths, using

horizontal type honing machines and tubing tools of the types previously illustrated for ordnance use. Substantial savings were effected, particularly in the reconditioning of worn barrels, since it obviated the necessity of disassembling and reassembling these barrels each time they were reconditioned. Other advantages were also realized in securing better accuracy, and in the elimination of slight assembly distortions which tended to cause more rapid wear.

Cost Data

As an example of costs of honing these barrels, a test was conducted using 2 1/4 in. diameter by 64 in. long tubes without any previous preparation after the spinning operation. These bores had as much as 0.025 in. taper, badly scaled and pitted surfaces, and required approximately 0.080 in. total stock removal for clean-up, correction of error and generation of accuracy and finish. Stock removal was obtained at the rate of 0.030 to 0.045 in. per hr., with total of 0.075 in. total stock removal per set of stones. Stone costs only were 0.16c. per cu. in., \$3.70 per tube, or 55¢c. per lineal inch based on the removal of 0.050 in. total stock, on this diameter and length.

FIG. 12—To obtain comparable finish on mating parts, the external surface of forged nickel steel piston rods used in recoil and recuperator cylinders are being honed and straight-line honed. Two such rods are shown, together with mechanically actuated hone of the hand brake type which are used in the set-up shown below.





CLAMPS made with 16 x 16-in. wooden timbers held the piling together for finishing touches. The welder's lines are fed by a gasoline-engine driven welder parked back of the old bridge.



VIEW of completed sections of new all-welded bents in the background and the wooden ties

Welded Steel Railroad Trestle

By L. H. HOUCK

DEPARTURES from every-day bridge building practices keynote the welded steel railroad trestle recently completed by the Florida East Coast Railroad Co. at Stuart, Fla.

This 1200-ft. bascule-type trestle across the St. Lucie River was fabricated on the site from steel bought direct from the rolling mills in standard lengths and is of welded construction throughout. It replaces a wooden trestle, which continued open to traffic until the new one was completed.

Economy of this type of construction was proven, states T. H. Gardner, structural engineer of the company.

In addition to a marked reduction in overall cost, the welded construction permitted making changes to take advantage of the terrain, and in this the steel was fabricated with practically no additional cost.

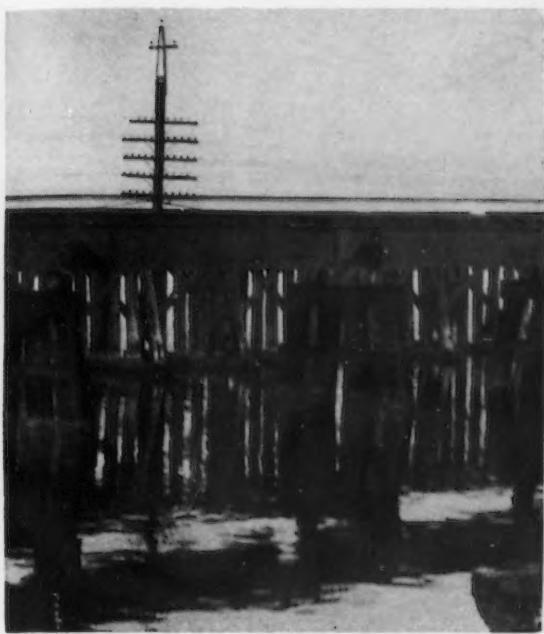
Even the fabricating shop, located on the banks of the river and beside the F.E.C. tracks, will not be a loss. Plans were so made that upon completion of the new trestle, this welded steel fabricating shop could be used as a loading shed and warehouse for the railroad company.

Here are the principal specifications of the trestle. It is 1200 ft. long, 6-ft., 6-in. wide, and required 800 tons of steel. Piling, bents and girders were all fabricated from standard steel forms and arc welded. The only wood is the ties which are set between steel tie brackets and anchored by hook bolts. A wooden tie-plate along the outside ends of the ties was used.

Seven Lincoln "shield-arc" electric welders were used for the welding. Electric motor driven types were employed in the fabricating shop and gasoline engine driven outfits were used out on the river. Use of the latter was found to be more practical than to try keep electric cables untangled. The welders with the gasoline outfits completed fabrication and joined the units together after they were set.

More than 1000 lb. of welding rod was used each week. A mild steel coated rod of high tensile strength and good ductility was used, mostly in 3/16-in. and 1/4-in. sizes.

Cutting, shaping and forming were done with acetylene cutting outfits, four or five being in use most of the time. Leveling of the plates on brackets on span ends was accomplished by grinding, since the amount to be taken off was small. Grinding was by 1/2 hp. portable machines.



steel railroad trestle at Stuart, Fla. The wooden showing at the top are on the old trestle.



SAND blasting preparatory to coating with red lead. The construction of the pedestal is shown, as well as the piling and top plate of the bent.

Replaces Wooden Structure

All small cutting, straight-line cutting, patterns and circles and washers, many of which were required, were cut from the sheet or bar with an Oxweld CM-16 portable electric-driven flame cutting machine. Since with this small machine it is possible to cut straights and circles automatically, it was kept in production a great part of the time. Many of the small parts used in fabricating the pedestals were cut on this machine.

Main Spans and Piling

As to the bridge—girders were 36-in. I-beams. The main spans were formed with two such girders 80-ft. long, which were completed with angles, cross members and tie brackets on the top and weighed about 19 tons. Each span was supported by four bents. Brackets on the ends of the main spans formed footing and support for a 26-ft. simple span.

Support for the trestle is obtained

from four 14-in. I-beams driven down to footing about every 26 ft. Depths to which the piling was driven to obtain footing ranged from 45 to 75 ft.

Here again welding was used with economy. Piling was driven down to footing regardless of depth. When the standard lengths became too short, other lengths were welded on and the pile was driven on down.

By a system of clamps made from 16 x 16-in. pine timbers, when the piles were driven, the tops were held together for welding of cross members and top plate. On this plate the pedestals were set and welded and all made ready for setting the span. Bearing piles were figured for a 90-ton load.

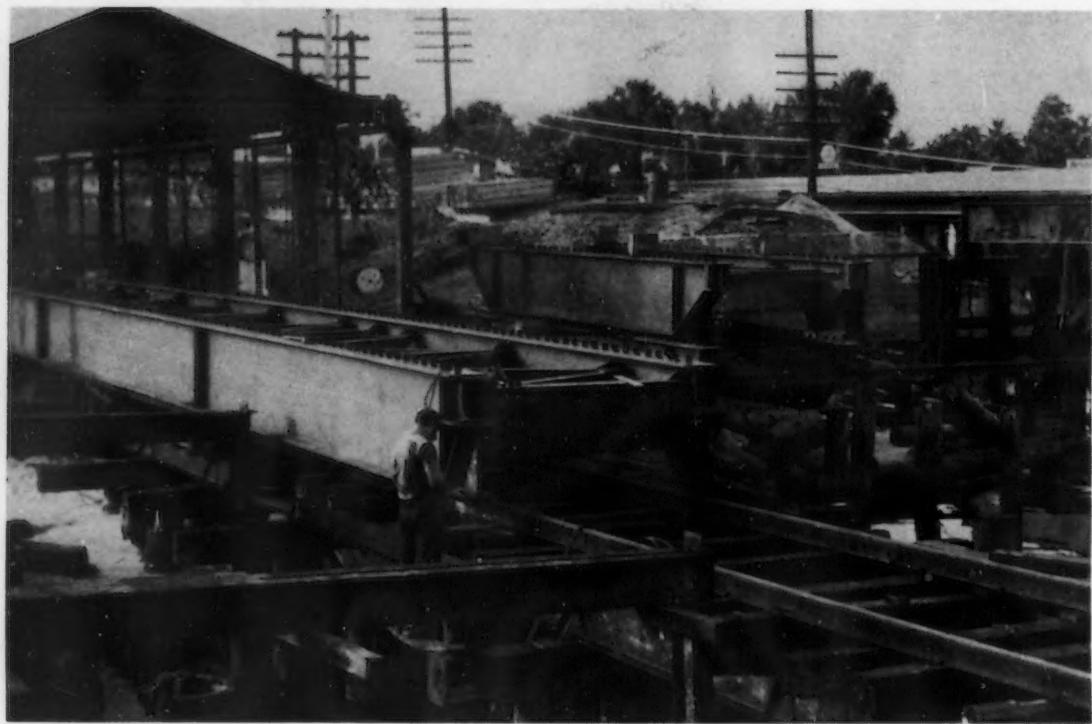
Welders Carefully Selected

Early problems of construction included the selection of competent arc welders and the devising of an effi-

cient system of inspecting the completed work. Mr. Gardner, engineer and designer of the structure, said they decided they must qualify their own welders to insure the quality of work desired. Thus they required all welders to pass the railroad examination regardless of any qualifications or certifications they might possess.

A welder passing the company examination and becoming certified by the railroad laboratory, however, was only certified for that job. No exception was made to the rule that all welder applicants must be certified by the railroad company, even when applicants presented government certification.

Oral and written examinations usually eliminated the inexperienced and incompetent. Applicants passing the first hurdles were set to making test welds of various types and these weld samples went to the laboratory for



• • •
FINISHING touches being put to completed main span by cutting torch. One of the completed 26-ft. simple spans is shown in the background.
• • •

thorough testing and analyzing. From those passing these final tests, approved welders were selected. In the light of the completed trestle these precautions are considered necessary.

All completed welds received at least two thorough inspections and tests before they were passed. These welds referred to are actual welds on the bridge and not test welds. Other inspectors followed out the weld seams to see that they were complete and no corners or back sides left out.

Shop work was under the supervision of John Bauer, an experienced bridge builder.

Tie Brackets and Pedestals

Tie brackets on top of the girders were cut from standard angle iron and welded to the top plate of the girder. Ties will lay between in the slots thus created and will be thus prevented from slide when traffic is applied. Every fourth wood tie will be held in place by a hook bolt. The

track will be provided with the regulation steel guard rail to prevent derailment.

Pedestals upon which the girders rest were fabricated from standard steel shapes and welded to the top plate of the bents. The girders rested between knobs made by a welded square to prevent side movement and the whole was welded when set.

Provisions had to be made when the fabricating shop was built to handle the heavy weights of the completed members. The 36-in. I-beam girders weighed 7 tons each and the completed span weighed about 19 tons in the 80-ft. lengths. So the shop was built with a heavy steel frame properly supported and all welded. It was designed for the handling of the members with suitable tracks for chain hoists and falls. The Yale & Towne hoists and falls employed were arranged so that the completed spans could be raised from their blocks and rolled suspended from the falls out to the edge of the water for loading on a barge. The spans were then floated to position and raised with a floating crane.

The only sub-contract on the job was one let by the railroad company to a barge company.

Work was started on March 15, 1938, and it was completed in about six months, including the time required to build the shop and install equipment. Time for fabrication was approximately 4½ months.



THIS 80-ft. span is being moved out of the fabricating shop to be loaded on a barge. Welders with oxy-acetylene cutting torches are dressing up the brackets.

Shafting, Hangers, Pillow Blocks and Stringers

By FRANCIS JURASCHEK
Consulting Editor, The Iron Age

THESE four items, shafting, hangers, pillow blocks and stringers, are generally regarded as of only minor importance in the scheme of industrial power transmission. Nothing could be further from the truth. Around the subject of shafting and its supports may be grouped most of the friction losses which today saddle production costs with such large and needless overhead charges.

True, the friction occurs at bearings, but the stresses to which bearings are subjected arise largely on the one hand in the shafts, and on the other hand in the equal and opposite reactions of the bearing supports. Two later articles will be devoted to discussions of transmission bearings and their applications. This article will serve as an introduction thereto, by way of a discussion of what bearings must support, and in turn, how bearings are supported.

It is a self-evident truth that no rotary motion can be produced without a shaft. Whatever turns, must turn around an axle, whenever that turning is for the purpose of communicating energy from one body to another. The rotor of a motor or of a turbine, the pistons of a steam or of an internal combustion engine, or the blades of a waterwheel or of a windmill, all impart energy to a shaft, which in turn communicates that energy to a means of driving the driven mechanism. Gears, pulleys, chain sprockets and hydraulic and pneumatic transmissions likewise depend upon shafting for their operation. Thus, as to function, shafting may be of two broad types:

1—It may be of relatively short length and used as the axle which holds the rotating member of a driving or of a driven mechanism—as the shaft of a motor, or the spindle of a machine tool.

2—It may be used, often in relatively long lengths, as the axle independent of a driving or driven mechanism, to support the rotating elements of a transmission device—as the shaft of a gear, a pulley or a chain sprocket.

In either case the shaft must be supported and run in two or more bearings, placed on either side of the rotating element fixed to the shaft

CHAPTER 39 of a Series on the Methods and Equipment of Industrial Power Transmission.

(or, infrequently, the rotating element may be overhung on the shaft beyond the bearings). A pillow block is a bearing housing, usually for heavy loads, and generally transmitting the bearing stresses directly to a floor or a foundation. A hanger is a bearing housing, usually for lighter loads, and generally transmitting the bearing stresses to a ceiling, a side wall, or a column.

It is of interest to grasp clearly the essential difference between a shaft and a bearing. Both are means of support, but the primary function of a shaft is to *resist* turning, while the primary function of a bearing is

to *facilitate* turning. Every step of the analysis of the functional values of both these elements depends on the recognition of this single point of difference. The shaft and its bearings work in harmony and the best advantage, when the design of each fulfills completely this point of difference.

Shafting

The ideal shaft would have three characteristics: (1) It would have no weight. (2) It would resist bending stresses perfectly. (3) It would resist torsional or twisting stresses perfectly. Manifestly, these three characteristics are incompatible. A shaft cannot have the strength to resist bending and torsional stresses without having mass, and therefore weight. The ideal shaft is an imaginary line. It is merely a center line, around which a rotating mass turns. But an imaginary line cannot carry the weight of the rotating body without wobbling or deflecting from its true position, or without loss of torque.

Hence shafting must be a compromise of little weight and much strength. To meet these requirements, steel of solid, circular cross-section is almost universally used today. Shafting for the transmission of relatively low horsepower, or medium power where the bearings are closely spaced, is generally cold-finished, low carbon steel of screwstock quality. This fits the needs of most lineshaft work, and of most driving and driven mechanisms of low horsepower. Cold-finished shafting is seldom used above $2\frac{3}{4}$ in. in diameter. For heavier work and for larger sizes shafting is usually hot-rolled and

turned to finished size in a lathe. This applies to shafting up to 6 in. in diameter. Above that size it is customary to drop forge shafting from specification steels.

The primary distinction between cold-finished and hot-rolled shafting is not made clear in these names, for both are hot-rolled from bars, to a size larger than that which may be

ability to resist snapping caused by repeated shock loads. Yield point indicates the actual working limit of the steel under all these stresses, and is the figure beyond which allowable working stresses should never go.

The American Society of Mechanical Engineers has made a careful and exhaustive study of the theory of stresses in shafts, and their findings

such shafting problems quickly. For cases involving very heavy loads, complicated stresses, and high values of power, the accurate sizing of shafting is essential, and in such cases the detailed engineering text-book formulas and tables should always be used.

Shaft sizes are generally large (in diameter) when speeds are low and bending loads heavy, or when bearings are not set close to the bending loads. Here the hot-rolled type of shafting comes into play. Smaller shafting can often be used with safety and econ-

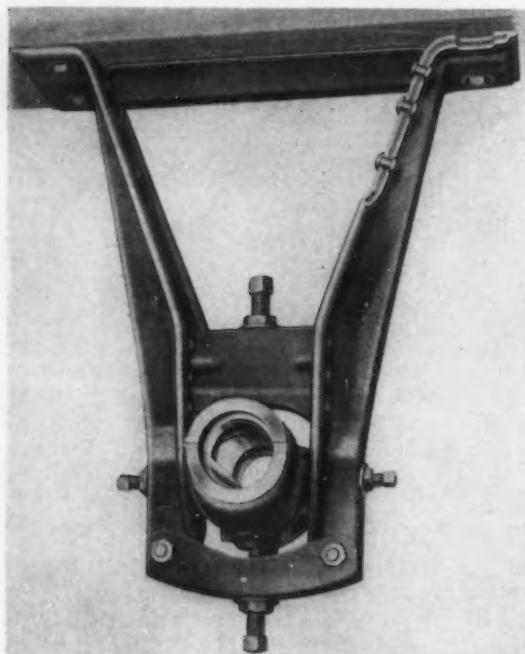


FIG. 1—Standard Pressed Steel Co. pressed steel hanger with shaft bearing adjustable four ways.

required. After this hot-rolling, the cold-finished shaft is drawn cold through dies, to the finished size, while the other type is machined to the finished size. Cold-finished shafting is made from various types of steel, ranging from low and medium carbon types through various grades of alloy steels. The hot-rolled shafting may be made from the same qualities of steel, but, except for the low carbon varieties is usually annealed before machining, and often heat treated after machining.

The important physical properties of shafting steel are tensile strength and yield point. Tensile strength is a measure of the static ability of the steel to resist the forces tending to pull it apart. Proportionate to and dependent upon tensile strength are the three qualities principally considered in selection; shear resistance, or the ability to resist breaking at the point of load, torsional strength, or the ability to resist twisting stresses, and fatigue strength, or the

conform to the results of good practice. Formulas for calculating shaft stresses based on this study may be found in engineering text-books and in manufacturer's catalogues, together with tables of the properties of the steels used for shafting purposes. It is beyond the scope of this discussion to go into such detail here. It may be said, however, that for industrial group driving purposes, or for line-shaft work in general, and for light to medium duty machinery of many types, cold-finished shafting is used almost universally. Under these circumstances power requirements are comparatively low, and shaft speeds are such that only reasonable stresses are involved. Simplified empirical formulas, such as those arranged by Thurston, make it quite easy to solve

omy with increased speeds and proper mounting of the shaft in anti-friction bearings. Shafts that are too small can be relieved of excessive stress by an additional bearing, or by relocating bearings in relation to load points.

The stresses found in shafting, according to William Staniar (Mechanical Power Transmission Handbook) are as follows:

1—*Torsion or Twisting.* Produced by turning moments of the rotating body.

2—*Flexure or Bending.* Produced by the combined pull of the tight and slack sides of a belt or rope. Likewise the thrust of gears, the pull of a chain, or the weight of parts carried or supported by the shaft tends to

FIG. 2—SKF four way adjustable anti-friction bearing mounted in cast hanger frame.



produce deflection or bending in the shaft.

3—*Torsion and Bending*. Produced by a combination of turning moments, belt or chain pull, and dead weight.

4—*Axial Tension or Compression*. Produced by endwise thrust as found in vertical shafts, shafts driven by bevel or worm gears, and in propeller shafts.

The magnitude of these stresses, their location and direction of application in relation to the point of support, the character of the forces, and the working strength of the shaft, are the basic factors in determining the size of the shaft.

Flexible Shafting

By virtue both of its name and function, flexible shafting departs radically from the requirements for rigid shafting. It is essentially a power transmitting medium, but is never used, like rigid shafting, to

this function is, of course, independent of power transmission. (3) Flexible shafting may be used to effect remote control of operations, such as the turning of a valve, the control of gun-fire, the operation of a switch or the manipulation of any device not easily reached by the operator. This is power transmission in a limited, and usually intermittent sense.

Flexible shafting is composed of two distinct parts, a core and a sheath. The core, or rotating element, is composed of several layers of wire closely wound, each layer being wound in the opposite direction from its adjacent layers, and each layer containing several wires. The wire used is generally a high-quality type of music wire. Total core diameters may vary from 0.13 inch for the transmission of fractional horsepowers up to 2 inches for the transmission of about 30-35 horsepower at 3500 r.p.m. The

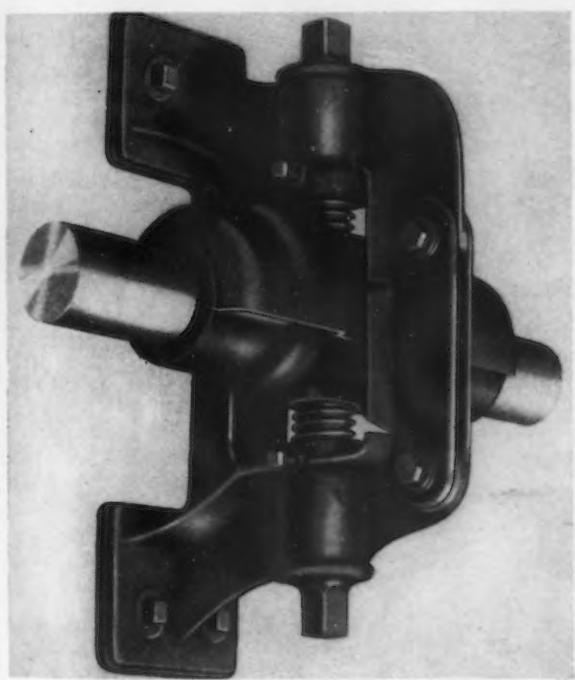
ordinary commercial sizes of flexible shafting, however, only run 1-1/8 inch core diameter, good for the transmission of about 23 h.p. at 3500 r.p.m. Beyond this size flexible shafting must be specially designed and constructed.

The sheath (or "case") is a non-rotating element, of braided wire, or spiral-wound metal through the hollow center of which the core runs. The sheath serves the dual purpose of protecting the core against damage, and of protecting the workman against the danger of being cut or seared by the rotating core. At each end of the core there are fittings for connection with the driving and driven mechanism rigid shafts; at each end of the sheath are ferrules fitting into the housings of the driving and driven mechanisms respectively.

A minimum size core may be used, in relation to the amount of power to be transmitted, when the shaft rotates in one direction only; when the shaft is to rotate in either direction at different times, a slightly larger size of core should be selected.

In the characteristics of transverse flexibility the sheath should conform as nearly as possible to the drive shaft which it encloses. In the ideal combination, sheath and shafting will bend with exactly the same flexure, and will parallel each other in the bends.

In considering the selection of a flexible shaft for power transmission

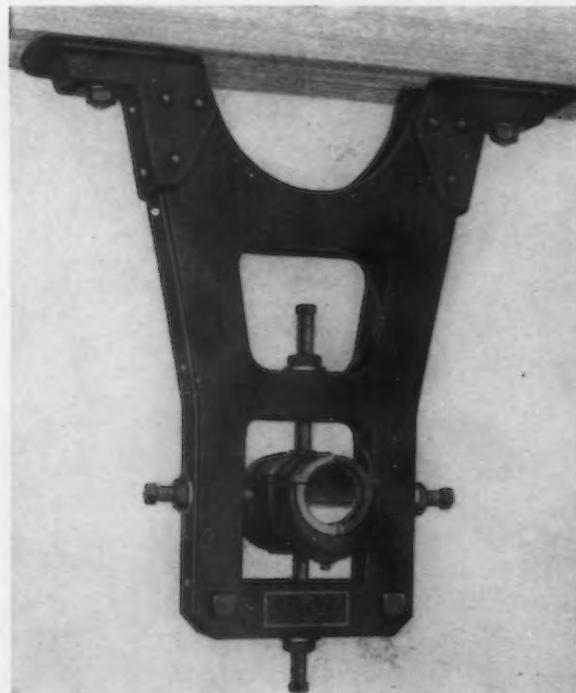


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AT LEFT

FIG. 4—Dodge Mfg. Corp. side wall or post hanger with shaft bearing adjustable two ways.

• • •



• • •

AT RIGHT

FIG. 3—Dodge Mfg. Corp. pressed steel hanger with shaft bearing adjustable four ways.

• • •

support a rotating body. There are three distinct and widely different uses for flexible shafting: (1) It may be used for power transmission on portable tools of all kinds, where the driven mechanism must be free to move in any plane; such as electric drills, screwdrivers, grinders, sanders, buffers, etc. (2) It may be used to give distant indication of the revolutions of a measuring instrument; such as a tachometer, speedometer, or any form of counting device, under conditions which cannot readily be observed at the point where the rotation of the driven body is taking place.



will bear on the winding and size of the shafting core.

6—Lubrication is a factor which should not be neglected. Flexible shafting may be regarded as a bearing throughout its entire length, as regards the core rotating within the stationary sheath. Flexible shafting in continuous use must be properly lubricated daily, and means must be employed to permit of such lubrication attention.

mechanisms when the shaft is an element of such mechanisms, or, more usually, a means of supporting a shaft which is completely independent of the driving or driven mechanisms. Hangers and pillow blocks comprise, in each case, a bearing which holds the shaft in line while permitting it to rotate freely, and a means of holding that bearing in a fixed position with respect to a building foundation, floor, ceiling, column or side-wall. A (CONCLUDED ON PAGE 82)

purposes, six factors should be borne in mind:

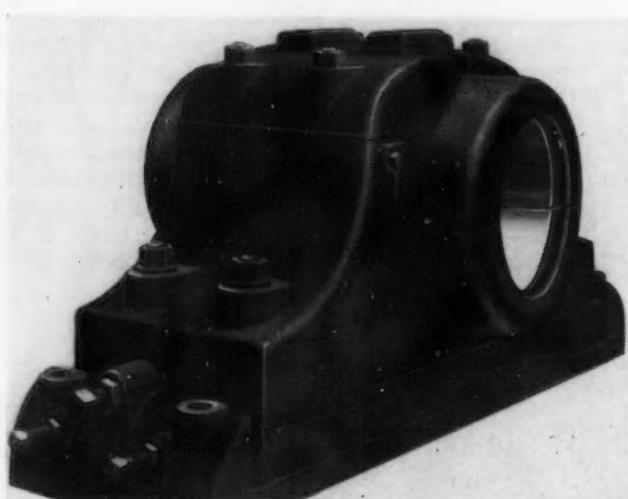
1—The horsepower to be transmitted and the speed at which the shaft is to be run. (In place of horsepower it is even better to know the actual torque in foot-pounds which the shaft will be called upon to deliver.)

2—If the value of the starting acceleration should be high, this should be given due consideration.

3—The type of service, that is, whether continuous or intermittent, will have a decided bearing on the size of shaft to be selected.

4—Any unusual conditions of service such as high temperature, or the presence of moisture or acids, will influence the type of sheath to be used.

5—As noted above, the direction of rotation, and whether the rotation will be in one direction only, or in both,



ABOVE
AT LEFT

FIG. 5—SKF light duty type anti-friction bearing pillow block.

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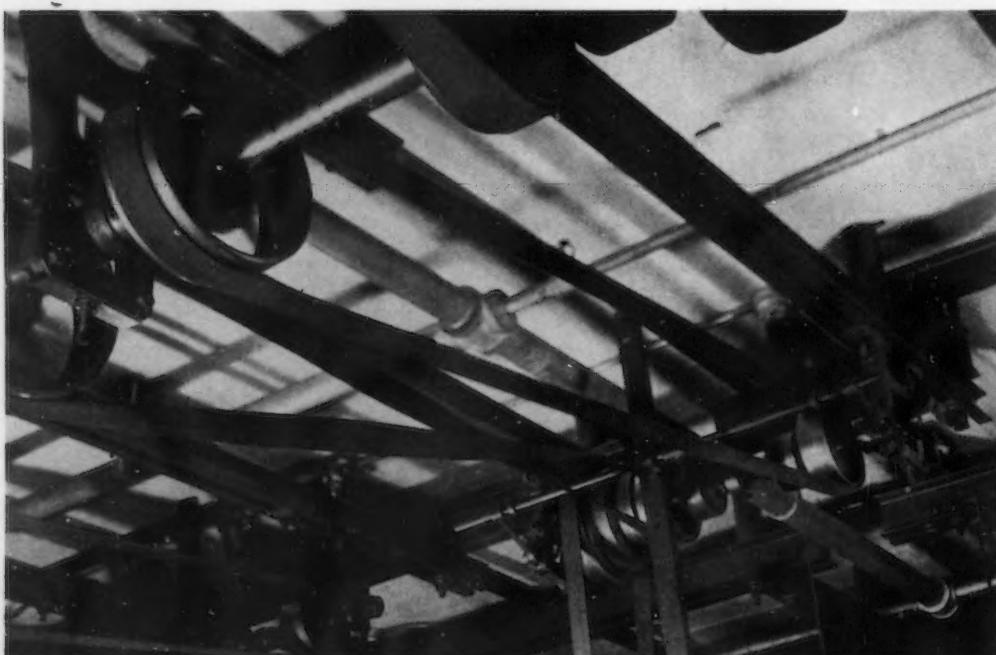
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FIG. 6—Dodge Mfg. Corp. heavy duty mill type pillow block with wedge-base adjustment of bearing.



Hangers and Pillow Blocks

Hangers and pillow blocks are means of supporting a rigid shaft at points entirely removed from the base or frame of the driving or driven



ABOVE

FIG. 7—Method of laying wires to form core of flexible shafting. Courtesy of Stow Mfg. Co.

• • •

AT LEFT

FIG. 8—Dodge countershaft arrangement in valve manufacturing plant, showing use of bolted channel section stringer system to support hangers

Look Before You're Struck

(CONTINUED FROM PAGE 25)

if office work is to be continued, of course. As a matter of fact if access to the regular office cannot be gained, it may be necessary to place orders with the printer for letterheads, checks, advertising matter, and various other stationery items, but this expense, although causing an additional outlay, is not entirely lost because the supply can be used up after getting back into normal operation again.

If it is necessary to rent a warehouse or shipping point as earlier suggested, this expense must not be overlooked. The same applies to traveling or living expenses of a shipping crew, if any, and all other expenses necessary to care for customers such as making up new tools, duplicating inaccessible ones lying in the strike bound plant.

When a plant is inoperative and outside concerns including competitors are depended upon for products, the business changes from a manufacturing enterprise to a jobbing business. Obviously the same margin of profits on sales will not be present. Indeed the conservative estimate would be that the products could be purchased outside at a slightly less figure than the selling price to the customer due to larger volume buying, but that this small margin will just about take care of additional transportation costs and other increased purchasing expense. In other words the sales during the strike period will just about break even with the purchase cost of the products, resulting in no profit or loss, the business being handled to maintain customer good-will and so the customer will be put to no inconvenience. Of course the above does not apply to a company manufacturing a patented product or to a distinctive product unless it is possible to duplicate it entirely on the outside.

Outside Income Helpful

Any non-operating income which the company enjoys will serve to reduce the expense of a strike, because the non-operating income continues regardless of the idleness of the plant. For example if excess property not required for manufacturing is rented to outside concerns, this rental will continue. Likewise other income such as dividends and interest on stocks and bonds owned will continue.

Having considered all of the above items thoroughly and having arrived

at a cost of a strike per month, it is well to take a careful look at the cash situation. In the event of a strike all current liabilities would eventually have to be liquidated without any corresponding income to take care of them.

It should further be remembered that only a portion of the current assets are available for liquidating the current liabilities and for providing the expenses of the strike. Inventories must be eliminated entirely because these are frozen in the plant. With

Here Are Members CIO Claims for Its Ten Largest Unions

A REPORT just issued by the Congress of Industrial Organizations indicates that this labor body—called the Committee for Industrial Organization until its recent convention in Pittsburgh—has 43 unions. Here are the ten largest unions and the claimed membership, not all of which is dues-paying:

United Mine Workers of America	612,113
Steel Workers Organizing Committee	525,612
Textile Workers Organizing Committee	450,300
United Automobile Workers of America	381,200
Amalgamated Clothing Workers of America	252,620
United Electrical, Radio & Machine Workers	157,891
United Cannery, Agricultural, Packing Workers	124,750
International Woodworkers of America	101,612
Oil Workers International Union	98,900
Transport Workers Union	90,125

most manufacturing concerns inventories constitute by far the major portion of current liabilities. Deferred charges cannot be depended upon as a source of cash, and as a matter of fact deferred charges are not included as a current asset by most accountants in the first place.

Only Quick Assets Left

This leaves only actual cash, securities that can be liquidated easily and without undesirable losses, and the collectible portion of accounts receivable. If sales are continued, however, during the strike accounts receivable will

remain about the same, and if the level of business should increase during this period we could expect the investment in accounts receivable to increase. Thus instead of being a source of funds accounts receivable might easily become a requirement for additional funds.

After the current liabilities are once liquidated there will be no further corresponding accumulation of liabilities with the exception of purchases of finished products from outside concerns which can be expected to be liquidated from the proceeds of future sales. Consequently the total current liabilities represent an immediate deduction from cash and not a recurring expense.

In addition to the current liabilities shown on any firm's books it should be remembered that at the time of the balance sheet there was a quantity of commitments representing outstanding purchase orders which have been issued, the goods for which have not been supplied or the invoice received. It may be possible to cancel some of these orders which have not proceeded too far, but all of them represent legal obligations of the company, which must be paid for out of the funds available. Because of these outstanding commitments not yet on the books it can be estimated that the regular weekly requirements for cash will continue for several weeks after the plant becomes inoperative.

Nobody Wants Strikes

In presenting this material no attempt is being made either to encourage or discourage strikes. Neither is it expected that management should be scared into the thought that strikes are too expensive. Nevertheless an attempt has been made to point out the necessity of analyzing and appraising the situation before going into a strike or for that matter even when no labor disturbances at all are foreseen.

Unless the ability to finance the expenses of a strike are in the picture, and unless well laid plans are made beforehand, no labor difficulty should be allowed to progress to strike proportions. Settlement should be made on the best terms possible without a strike, for nothing is ever gained by management from a strike where management was unprepared, requiring capitulation on its part. The better plan seems to be not to permit labor difficulties to involve a strike unless the issues are important, the demands unreasonable on the part of labor, and unless management goes into it with the idea of winning.



150th A. I. M. E.

DONALD B. GILLIES

*President of A.I.M.E.
for 1939*

College of Mining and Technology, in 1893 with the degree of mining engineer, the president of the college referred to Mr. Gillies as "a good student and a great athlete (10 sec. for the 100-yard dash), a most unusual happening." His first job was "pushing a slag pot" at the Montana Ore Purchasing Co. smelter, but different jobs and promotions followed in regular succession, and 1910 found Mr. Gillies in Mexico managing the properties of Corrigan, McKinney Steel Co. In 1918 he arrived at Cleveland to take up the duties of vice-president of Corrigan, McKinney Steel Co., later to rise to the presidency. With the consolidation of the Corrigan, McKinney and the Republic Steel Corp. properties in 1935, Mr. Gillies became vice-president of the latter company, which position he still holds.

The various medals and honors of the A.I.M.E. also were announced and presented at the annual banquet. The William Lawrence Saunders Medal for 1939 went to Louis Shattuck Cates, president of Phelps Dodge Corp., for "signal accomplishment in the conception and application of superior mining technique, and in the organization and administration of major mining and metallurgical enterprise."

The Robert Woolston Hunt Award for the best Institute paper published during the year on iron and steel, went to John Chipman and Kenneth Charles McCutcheon, the prizewinning paper being "Evolution of Gases from Rimming Steel Ingots," which was presented at the annual meeting a year ago. Professor Chipman was born in Tallahassee, Fla., April 25, 1897. He received his B.S. degree from the University of the South in 1920, after interrupting his course in 1918 to serve in the U. S. Army as

ARRIVING from all parts of the United States and several score of foreign countries, over 2500 members of the American Institute of Mining and Metallurgical Engineers last week gathered at the Engineering Societies Building, New York, for the 150th session of the society. The four-day session was crammed with papers clearing away a year's accumulation of research in mining, ore treatment, ferrous and non-ferrous metallurgy, and a score of allied sciences. But notwithstanding the daily pressure of simultaneous technical sessions, there remained plenty of enthusiasm for the social side of the convention, and it's just possible that many an engineer will longer remember the stresses and strains engendered by Billy Rose's hoofers at the Diamond Horseshoe than those carefully propounded in post-luncheon technical meetings.

The first major item of the convention's agenda, the All-Institute meeting Monday afternoon, was well attended, as might be expected from the nature of the speakers selected:

Rear Admiral Clark Woodward took as his subject "Industry's Relation to National Defense"; and Tom M. Gilder, president of Republic Steel Corp. and president of the American Iron and Steel Institute, spoke on "Some Economic Problems of the Mineral Industry." On Monday evening the regular dinner-smoker was held at Billy Rose's Diamond Horseshoe, Hotel Paramount, and Tuesday evening was devoted to the usual informal dance at the Waldorf-Astoria's Starlight Roof Garden.

The high point of the business and social program was the annual banquet in the Grand Ball Room of the Waldorf Wednesday night. Herbert Hoover was a guest of honor, and Daniel C. Jackling, president of the A.I.M.E., turned over the office to Donald B. Gillies, vice-president of Republic Steel Corp., who will function during 1939 as president of the A.I.M.E. Donald B. Gillies was born Nov. 4, 1872, at Bruce Mines, in Ontario. On graduating from Michigan Mining School, now Michigan

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a second lieutenant of field artillery. An M.S. degree was received from the University of Iowa in 1922, after which he became assistant professor of chemistry at Illinois Wesleyan, only to later go to the University of California to get his Doctorate in 1926. From 1934 to 1937 he was associate director of research at the American Rolling Mill Co., Middletown, Ohio, leaving there in 1937 to become professor of metallurgy at the Massachusetts Institute of Technology. Mr. McCutcheon was born in Pittsburgh, Oct. 23, 1892, and graduated with a degree of M.E. in mining and metallurgy from Cornell in 1915. The following years were devoted to work for Carnegie Steel Co. and service abroad with the U. S. Army. In 1922 he was employed by the American Rolling Mill Co., Ashland, Ky., as assistant superintendent of the open hearth, becoming superintendent in 1924. Since 1930 he has been assistant general superintendent of the Ashland division of that company.

To the author or authors of the paper representing the most notable contribution to metallurgical literature presented before the Institute of Metals Division of the A.I.M.E. and published by the Institute, there is presented each year the Annual Award Certificate of the Metals Division. The Award for 1939 went to Frederick N. Rhines, assistant professor of metallurgy, and Robert F. Mehl, director of the Metals Research Laboratory, both of the Carnegie Institute of Technology. Their paper was entitled "Rates of Diffusion in Alpha Solid Solutions of Copper."

The Alfred Nobel Prize, which is open to any member of the four Founder Societies, or of the Western Society of Engineers, who contributes

a paper of particular merit that is accepted by his society for publication before the author is 31 years old, went this year to Ralph J. Schilthuis, who will be 30 years old on March 2. Mr. Schilthuis was educated at the Colorado School of Mines and works for the Humble Oil & Refining Co. The

award was made for a paper entitled "Connate Water in Oil and Gas Sands." For the benefit of the uninitiated, connate water is water that was in the oil-bearing strata before the oil got there, probably coming from the ancient seas when the strata were laid down.

H. W. Gillett, Howe Memorialist, Examines Creep Critically

It's a gloomy picture, says Gillett, and one that could well stand some horse sense in the superposition of qualitative estimates upon some quantitative base line.

UNDoubtedly the preeminent technical paper in any annual meeting of the A.I.M.E. is the Henry Marion Howe memorial lecture. It was presented this year by H. W. Gillett, chief technical advisor of Batelle Memorial Institute. Mr. Gillett's paper Thursday afternoon dealt with "Some Things We Don't Know About the Creep of Metals," and not only was the subject treated of major interest, but it was made doubly so by Mr. Gillett's inimitable manner of wording and delivery.

Mr. Gillett first pointed out that creep at a given load depends on time and temperature, which, is recognized even by the layman. But what the engineer wants to know is a rephrasing of Howe's question, to wit, how long can a given load be carried by a given alloy at a given temperature and not have the piece stretched too much?

The "how long" and the "too much" vary with the service. Petroleum cracking tubes and heat resistant furnace parts might stand 5 per cent stretch in five years, and some steam turbine parts must not stretch more than 0.2 per cent in 25 years.

The accumulated deformation sounds quite large in the former case, but the two rates of deformation figure out roughly to a millionth of an inch per inch per hour, and a hundred millionth of an inch per inch per hour. (The length change for a temperature change of 1 deg. F. due to thermal expansion is around six-millionths of an inch per inch.). Increasing the temperature 10 deg. F. at some loads and temperatures may double the rate of creep, i.e., halve the service life. Extreme care in temperature control is therefore essential if creep behavior is to be appraised correctly.

If often takes 500 hr. for a specimen to make up its mind to show its really characteristic creep rate. Depending on the amount of evidence required, a creep test must go on for another 500 to 2500 hr. While 1000 or 3000 hr. is long and tedious from the testing point of view and an irritating delay in the case of acceptance tests, it is very short in comparison with the expected service life for which parts must be designed.

Mr. Gillett then pointed out that in the pioneer days tests were short and temperature control lax. Only recently has technique been perfected so that different laboratories could check each other. The careful ones can do so now, and the situation is steadily improving, but it is necessary to scrap a very large proportion of published data as unreliable.

Grain Size Behavior

If technicians seek to determine the properties of steels and alloys in general and not merely the properties of a given specimen, a further large proportion of the scanty reliable data available must be scrapped, because the grain size of the material studied was unrecorded, i.e., a major variable disregarded. Grain size, or more truly, some more deep seated variable that is evidenced by grain size, plays such a large part in creep resistance that comparisons made on materials of different grain size are invalid.

If the theories of creep were being discussed, it would be necessary to face the question of why coarse grained material is the better at high temperature and fine grained at low. That is, why is it better to have less grain boundary area at high temperature? The "amorphous cement" theory once advanced as an explanation has long been abandoned as incorrect. The concept of an "equicohesive temperature," put forth to explain intragranular fracture at low temperature, intergranular fracture near the melting point, and postulating some balance somewhere in between, has been distorted to apply to creep conditions where there is no design for fracture. If there were a real temperature that marked a true dividing line of creep behavior and if it were accurately determinable, it would offer a useful point of view. Actually this temperature is indeterminate, and the glib phrase serves to muddy rather than to clarify thinking on creep. What we should really be concerned with is whether strain hardening can occur at the temperatures and stress in ques-

tion. So far as Mr. Gillett could see, this is determinable only by the creep test itself.

Another possible explanation for the temperature and grain size behavior was pointed out by Mr. Gillett, but that too is likely to make workers think they have understood a phenomenon, when all that has been done is to give it a name. Even another useless theory is that which is usually published. All these theories are based on mental pictures, not on what can be seen and proved.

Coming back to concrete things, Mr. Gillett showed that the effect of carbon on creep of pearlitic steels of similar grain size, over the whole carbon range, is not known. Not knowing much about the base line of carbon steel, workers are even more hazy about the effect of alloying elements. Only when an element is so powerful as to swamp out other variables is there a real idea available as to its effect. Molybdenum is such a powerful element.

Among thoroughly killed plain carbon steels, austenitic grain size is a major variable, and, as a rule, two steels can often be made to approach each other rather closely if coarsened to the same degree, but the rule fails with rimmed steels and with some steels that are just over the line of killed steels. That is, if one heat of known creep resistance is made, there is no assurance that the next one, of similar chemistry, treatment, and even of similar grain-coarsening characteristics, will act the same. Active study is going on to clear up the problem, but there is still no known way of ensuring identity.

Creep of lead at and near room temperature is an engineering problem in itself, according to Mr. Gillett, and is especially interesting since it ought to resemble creep of stronger metals at higher temperatures. Tests on lead are easy and cheap to make and a lot of such tests have been reported. They are most bewildering, for a few hundredths or even thousandths of a per cent of an alloying element will shift the creep behavior all over the lot. To those who think they can generalize on creep, a study of the data on lead, and particularly the extensive dope from Australia, is recommended. It will have a chastening effect.

In view of the time and expense of making regulation creep tests on steel, there is a great urge for short cut tests from which, by some proportionality factor, creep properties might be cal-

culated. Creep testing can be looked at as proportional limit testing very slowly carried out, so relationship has been sought between creep data and those obtained by short time high temperature proportional limit tests, "time-yield" tests, or the course of the creep curve between the 10th and 20th or 48th and 72nd hr., or some such period. It is well established that



H. W. GILLETT
Howe Memorial Lecturer

there is no usable proportionality, said Mr. Gillett, but what is sought by a creep test demands the time of a creep test for its development.

Short cut tests of the nature of identity tests have been proposed for acceptance purposes in which a specimen is severely overloaded so it will fail in some 10 to 100 hr., and postulates that if material A failed in 26 hr. material B, failing also in 26 hr., will show the same creep properties as A. The postulate seems untenable, since it assumes that response to severe deformation evaluates behavior at the very onset of plastic flow. It is known very well that the short time high temperature tensile test tells nothing about creep, it tells only about overload behavior. The somewhat more extended tensile tests are unlikely to do more than somewhat extend our overload information with-

out revealing anything certain about creep.

There is no mechanical test of metals in which the metals act so individually as they do in creep. Even each heat among supposed duplicates may strike off at its own sweet will, said Mr. Gillett. That is, not enough is known of the fundamentals to exercise much control.

in relaxation or in creep is evidence that behavior in the creep test is governed by the creep conditions, i.e., that phenomena go on under very slow and tiny deformation which are revealed only under these exact conditions.

Mr. Gillett later pointed out that the mathematics of extrapolation are terribly complex and if a formula is

If creep data are served up in a family of primary curves, and a curve of extrapolation is drawn free hand, the basic data is probably secured on the fundamental question of strain hardening vs. annealing in material of the initial structure provided, just as accurately as by attempting a pseudo-precise graphical or mathematical extrapolation, and with such a plot staring engineers in the face to show how small a family of curves there is and how short the testing time was, engineers are less likely to kid themselves as to the reliability of their conclusions.

More Data Needed

To such basic quantitative data, it is possible to apply known metallurgical principles as to stability of the initial structure and come out with a reasonable guess. Such a method isn't bad engineering at that.

Mr. Gillett then stated that in his opinion engineers will reach the point where the single load and temperature creep test, continued long enough to show a clear-cut "stage two" creep rate and give an inkling of the strain hardening behavior, will become a point of departure. The grain size variable, the effect of changes in stress or temperature, the metallurgical stability, the propensities toward general or intergranular oxidation or corrosion from the outside or accumulation of intergranular material from the inside, as well the effect upon creep of vibration, of impact, and of intermittent or cyclic heating, will all be taken into consideration and as many of these factors as apply in a particular case will be superimposed on the base line of creep behavior under test conditions.

The great engineering need is for a thorough, even though qualitative, metallurgical insight into the idiosyncrasies of the individual materials to be used at high temperatures. Stability, tempering and spheroidization propensities, precipitation hardening and embrittlement tendencies, all can be studied by rather inexpensive methods. It is not difficult to evaluate the grain-coarsening propensities. Unfortunately, evaluation of strain-hardening proclivities under creep conditions does call for the application of creep conditions.

The more thought given to creep,



JOHN CHIPMAN

Joint Recipients of Robert W. Hunt Award



KENNETH C. McCUTCHEON

Relaxation tests, reproducing the condition of a stressed bolt in a stiff flange, are sound engineering tests for bolts when they do duplicate the conditions of bolt service and relaxation tests come to approximate constancy quicker than creep tests. In such tests, stretching progressively decreases stress by some program set by the properties of the sample and not duplicated in a test on a sample of different properties. "Down step" creep testing runs into the same difficulty, that of setting a stress change program by which different materials can be compared. Some engineers claim to be able to extract true single load creep comparisons from relaxation tests, but I cannot follow their processes of reasoning. Soderberg, on the other hand, says that relaxation data cannot be gotten from creep data. The converse should be equally true. That material acts so uniquely

found that would exactly combine all the different functions resulting from each variable, and data is fit for one lot of metal, it would be necessary to again establish the functions of each variable for the next material. Mathematical attack on the problem is essentially a post mortem and the mathematicians of creep are beginning to admit that there are too many variables to deal with save in some unreal, idealized case in which some of the practical variables are omitted at the start.

This is a gloomy picture. Not much of anything is known about creep when it is looked at with all its complexities. But other equally difficult engineering problems that cannot be fully worked out quantitatively are handled by application of horse sense in the superposition of qualitative estimates upon some quantitative base line.

concluded Mr. Gillett, the more convinced he was that the creep properties of metals and alloys are so extremely varied, complex, and characteristic of particular compositions,

structures and grain sizes that generalizations on creep are likely to be premature. Energies might better be concentrated on the accumulation of more facts to fill the yawning gaps

of the things now not known. With plenty of facts about individual alloys and conditions of actual service, plain horse sense can do an excellent engineering job.

Surface Characteristics of Stainless Steels

Polished and buffed surfaces have better corrosion resistance than those by cold rolling. A proposal is made that passivity of stainless-alloys is not due primarily to a protective oxide or oxygen film.

ONE of the most interesting sessions of the Iron and Steel Division was that of Wednesday morning, dealing as it did with surface characteristics of stainless steels, a subject which is receiving an increasing amount of attention. The two papers of that session were "Corrosion Characteristics of Stainless Steel," by H. A. Smith and S. P. Odar, both of the metallurgy department of Republic Steel Corp., and "The Nature of Passivity in Stainless Steels and Other Alloys," by H. H. Uhlig and John Wulff, both of Massachusetts Institute of Technology.

The latter paper was divided into two parts, the first dealing with experiments on passivity, and the second dealing with the nature of passivity. For the first part, Messrs. Uhlig and Wulff concluded that the electron diffraction work performed does not indicate the presence of an oxide film of the order of 10 Å. or greater, whether crystalline or amorphous. In accordance with the work of G. P. Thomson on passivated iron, it can only be said that the film if present on the alloys must be less than 10 Å. and probably less than 7 Å. In such case the films are probably more like those of an adsorbed nature than a true oxide. It was pointed out, however, that even the presence of a thin adsorbed film (regardless of what it is composed) as a fundamental cause for passivity is speculative and cannot logically be inferred from electron diffraction experiments.

It has been shown, through a study of corrosion products of stainless steels, that the surfaces of the alloys are of essentially the same composition as the alloy. This can be interpreted either that contrary to conclusions based on analysis of thermally produced films, the surface film is of the same composition as the alloy, or that no oxide film exists.

The authors then pointed out that analyses of anodic corrosion products show that an 18-8 containing 3 per cent Mo, which is very resistant to chlorides, corrodes electrolytically in NaCl solution as higher valence salts, including chromates and ferric salts. The latter corrosion products, useful as passivating agents, are apparently associated with the alloy resistance to chloride ions. Mo 18-8 corrodes electrolytically in NaBr to form lower valence salts like Cr^{++} and Fe^{++} . Anodic corrosion products of 18-8 either in NaCl or NaBr are Cr^{++} and Fe^{++} . Iodine is discharged as the element on either 18-8 or Mo 18-8 anodes, using iodides as electrolyte. Molybdenum as anode in chlorides, bromides or iodides, forms the oxide.

By impressing an increasing electromotive force on a cell made up of a steel anode and silver-silver halide reversible cathode, the potential was determined at which a halogen ion begins to react with the steel anode. This was called the threshold potential. It was shown by Uhlig and Wulff that the threshold potentials for platinum correspond to the decomposition potentials of halide ions and agree satisfactorily with electromotive force equilibrium potentials reported in the literature. It was also shown that threshold potentials for stainless steels, contrary to indications in the literature, can be explained without reference to a hypothesized protective film. The threshold potential is not necessarily a film break-down or film break-through potential, but analogous to the decomposition potential.

It was shown through threshold potential data that the tendency for 18-8 to react with chloride and bromide ions is the same. For Mo 18-8, the tendency to react with bromide ion is somewhat less than that for 18-8, but with chloride ion, Mo 18-8 shows extreme resistance. In accordance with these results, it was found

that 18-8 corrodes by pitting in either ferric chloride or bromide. Mo 18-8 resists the action of ferric chloride, but corrodes by pitting in ferric bromide. Bromide ion more effectively than chloride ion breaks down passivity of the Mo 18-8 alloy, which is contrary to expectations according to the porous film theory. It was then concluded that 1.5 mole per cent Mo in 18-8 stabilizes the passivity of the alloy by another mechanism.

The authors then proposed that passivity of stainless alloys is not due primarily to a protective oxide or oxygen film, for the following reasons:

(1) Electrochemical potential measurements of stainless alloys in oxygen-free electrolytes are inconsistent with an oxide or oxygen film theory.

(2) Analyses of anodic corrosion products, the specific effect of bromides in corrosion of Mo 18-8 and the effect of 1.5 mole per cent Mo added to 18-8 are not readily explained by a protective oxide film.

(3) Threshold potential measurements mentioned in the literature as a gage for film resistance are readily explained as decomposition potentials not involving film concepts. The considerably greater tendency of bromide ion to react with Mo 18-8 than the smaller chloride ion and the equal tendency of both ions to react with 18-8 does not readily fit into the porous film picture of passivity.

(4) A theory of passivity based on electron sharing within the metal lattice accounts quantitatively for the composition of several passive iron alloys, and plausibly explains the experimental results described without resorting to a protective film.

In the second part of their paper on passivity, that dealing with the nature of passivity, Messrs. Uhlig and Wulff came to the conclusion that the passivity of metals and alloys can

be ascribed to electron sharing of metal atoms. This concept explains the effect on passivity of alloy constituents like chromium and molybdenum in stainless steels as well as the effect of the normally considered passivating agents like nitric acid or a layer of adsorbed oxygen atoms.

It was shown that where the proper sharing ratios occur in the metal, there was obtained experimental proof that the surfaces exhibit the properties of passive metals. In evolving such a theory for alloys, the authors limited themselves to the transition and pre-transition elements, which, indeed, show a striking tendency, as pointed out by others, to exhibit passive characteristics. These same elements may have exactly the surfaces most suited for chemisorption, particularly of oxygen, and in certain media chemisorption may always be a concomitant of passivity. The indication remains, however, that these chemisorbed films are not always the cause of passivity, particularly for the passive alloys. The same may be said for normal oxide films; that any part they play in protecting the metal surface of passive alloys or transition elements as would a paint film is secondary to the actual change that takes place in the reactivity of the metal itself when becoming passive. The situation for elements like aluminum and magnesium may be another case. In this case it is a dealing with a closed-shell atom with the chemical oxide coating playing a role in protection and the effects of adsorption not as apparent.

The authors' concept of passivity is that in the pure state the passive alloys and the transition and pre-transition elements like chromium and nickel are passive. They are more passive if in contact with an oxidizing or electron-absorbing agent like nitric acid or an adsorbed layer of oxygen atoms (not the oxide). They lose passivity if charged in some way with hydrogen, which tends to dissolve in the metal lattice as protons and electrons. Dissolved hydrogen is considered to fill in electronic energy levels of the lattice normally responsible when unoccupied for passivity. By removing hydrogen through exposure of the metal to air or an oxidizing medium, the metal changes from an active state to one that is passive.

It was then observed that the present theory of passivity based on electronic sharing combines and makes a consistent unity of many of the pre-



J. H. NEAD

Chairman, Iron and Steel Division

viously proposed theories; particularly the hydrogen solution theory of Grave and others, the oxide film theory of Faraday and more recently U. Evans and W. J. Müller, the allotropic change theory of Smits, the valence theory of Finkelstein and the adsorption theory of Bennett and Burnham and Langmuir. Russell's scheme of passivity based on electronic configuration of the atom also



LOUIS S. CATES

William Lawrence Saunders Medalist

finds its counterpart in the present paper, although in the use of spectroscopic data the authors followed another path.

The utility of the authors' viewpoint rests on its greater breadth of applicability to passive phenomena in general and the treatment of passive alloys in particular. The theory is shown to be in agreement with known compositions of passive iron-chromium, iron-molybdenum, iron-nickel and iron-nickel-molybdenum alloys. Furthermore, it permits an interpretation of anodic corrosion products of stainless steels as well as threshold potential measurements in halide solutions, which an oxide film theory can account for only with difficulty.

In the paper dealing with the influence of mechanical finishing on the corrosion characteristics of stainless steel, Messrs. Smith and Odar had as their objective,

(a) to know more detailed facts about the influence of mechanical finishing on the corrosion resistance of the usual austenitic types of stainless steel.

(b) to learn something about the mechanism of attack of various representative types of corroding media, and

(c) to know more about the causes behind the peculiar corrosion behavior of the various finishes.

It was pointed out that the art and science of mechanical surface finishing on stainless steel is developing very rapidly but in all the multitude of finishes produced, there are only a few fundamental corrosion factors, all of which were discussed in the paper, which need to be considered when it is wished to produce a finish with predetermined characteristics. Conversely, if the processing necessary to produce a given finish is known then it will be possible to predict with some accuracy just how this finish will behave in a given service.

A summary of the work of Smith and Odar indicated that:

(I) There is a distinct difference in the corrosion resistant characteristics of mechanically prepared finishes on stainless steel as created by,

(a) Heavy cold rolling and as created by,

(b) Polishing and buffing.

Polished and buffed finishes are definitely superior.

(II) If properly accomplished, the greater the uniformity and amount of cold work in the form of polishing

and buffing, the more corrosion resistant is the surface of the steel.

(III) This improvement in corrosion resistance rests primarily on two factors:

(a) First, the surface of the steel is microscopically more uniform and

(b) Second, uniform, very highly polished and buffed surface films are inherently more corrosion resistant than annealed, heavily cold rolled or non-uniformly cold worked surfaces.

(IV) The order of corrosion resistance of the various finishes tested depends to some extent upon the type of corroding agent to which the steel may be exposed.

(a) The reaction of acid chloride surroundings upon the steel is particularly sensitive to the amount of cold work in the base metal.

(b) This does not seem to be true in weak acid sulphate conditions, concentrated nitric acid, or ferric chloride solutions.

(c) Potential measurements in a chloride solution are sensitive to conditions of work created by cold rolling on one hand and buffing on the other.

(d) As in other corroding media, the more highly and uniformly "flowed" is the surface of the steel, the less is the pit susceptibility in ferric chloride, an accelerated pitting test. It should be noted, however, that surface irregularities of a critical microscopic size may render stainless surfaces susceptible to pitting.

(V) There is a definite difference between the type of corrosive attack of various chemical solutions. Acid chloride and acid sulphate solutions usually in stainless steel of this type give rise to a general attack. Ferric chloride solutions are macroscopic pitting agents, while nitric acid gives rise to a pitting attack on the microscopic scale in addition to a general attack.

(VI) It can now readily be appre-

ciated that proper care should be taken with regard to the preparation of samples for any type of corrosion testing on stainless steel. A simple matter of improper surface preparation or of an unnecessary amount of cold work may, depending upon the corrodant used, be the cause of acceptance of material otherwise inferior or of failure to accept material, which if properly prepared, would have fulfilled specifications satisfactorily.

(VII) Finally, it was pointed out that caution was used in interpreting the corrosion results. The conditions of testing were necessarily accelerated by the use of high temperatures or of concentrated solutions so that results would be obtained in a reasonable time. Any extrapolation from these data over to service conditions should only be done by those very familiar with the corrosion resistant characteristics of various types of stainless steel.

Metals Division Features High-Purity Metals

Metals of high purity are rapidly being applied commercially. Silver bearings resistant to seizure. A limiting creep stress at high temperature is suggested. No need for very pure lead observed.

THE Institute of Metals Division of the A.I.M.E. chose a particularly timely topic to feature in its meetings—high purity metals. Industrial interest in this problem is steadily growing, and all of Tuesday was devoted to this subject, embracing zinc, tin, lead, nickel, platinum and silicon.

Summaries of the various papers of the Metals Division which are of more immediate industrial interest follow:

In "Pure Zinc—Its Preparation and Some Examples of Influence of Minor Constituents," by E. C. Truesdale, and Gerald Edmunds, both of New Jersey Zinc Co., the authors described a method of preparing spectrographically pure zinc, and the influence of minor constituents, both natural and added, was reviewed. It was pointed out that binary zinc-aluminum alloys when pure are highly resistant to corrosion, and that a few thousandths of a per cent of lead, cadmium or tin, will cause severe intergranular corrosion, resulting in disintegration of the alloy during exposure to warm, humid

atmospheres. A few hundredths of a per cent of magnesium prevents this corrosion, providing that the impurity contents are within the limits set by the A.S.T.M. Tentative Specifications for Zinc Base Alloy Die Castings, B 86-38-T. Magnesium up to only 0.006 per cent added to rolled zinc-copper alloys containing about 1 per cent copper, is said to increase its creep strength more than 50 per cent.

In the paper, "Pure and Low Alloy Lead," by G. O. Hiers, of National Lead Co., it was said that low lead alloys containing copper, tellurium and calcium, essentially as binary alloys, are currently receiving much attention. Of the binary and ternary alloys of tin and antimony with lead, those containing less than 98 per cent lead are very important industrially, while the low alloys (over 98 per cent lead) are relatively unimportant, except for use as foil and cable sheathing.

Lead alloys containing small amounts of antimony and arsenic are important commercially in use as shot or bullet metal.

Lead of 99.9994 per cent purity has been prepared and tested in comparison with commercial lead of 99.95 per cent purity for some mechanical properties, but the properties of very pure laboratory lead do not indicate a possible need for it. However, it is desirable to add about 0.06 per cent copper, less than 0.1 per cent tellurium or less than 0.8 per cent calcium, to lead, to produce essentially binary alloys. The author said that the realization of this desirability is growing.

The paper, "Properties of Nickel," by E. M. Wise, and R. H. Schaeffer, both of International Nickel Co., reviewed and brought up to the present the factual data accumulated constantly and correlated at frequent intervals on the subject of pure nickel, and the effects of small percentages of alloying elements. A point brought out in the discussion, by E. Fetz of the Wilbur B. Driver Co., Newark, N. J., was that the high purity metal markedly lowers the recrystallization temperature of the alloys in which it is used.

In the paper "Pure Tin," by Bruce Chalmers and D. J. Macnaughtan, it

was said that although a study of the mechanical properties of pure tin may not lead to any striking technological advances, the possibility of some new use arising from any one of the less obvious properties must not be overlooked. At the same time, many properties are shared by all metals and the effect of increasing purity on the more fundamental properties is therefore of interest.

The paper described the properties of three grades of tin, Chempur, Williams Harvey and Vulcan Detinning Co., with impurities totaling 0.01318, 0.00369 and 0.00071 per cent respectively. These properties discussed include crystal structure; mechanical properties of single crystals, bicrystals and polycrystalline material; electric and magnetic properties; and chemical properties in relation to corrosion resistance.

Another paper, "High Purity Silicon," by A. B. Kinzel and T. R. Cunningham, of Union Carbide & Carbon Research Laboratories, Inc., stated that comparatively little accurate data are available on high purity silicon. Silicon "metal" is available commercially, of 99.84 per cent purity, and has been produced up to 99.952 per cent purity in the laboratory. The commercial interest in pure silicon is limited, but a good demand exists for a grade of material for use as an alloying addition which is substantially free from impurities like iron which is objectionable in copper alloys.

Ductile silicon is still hoped for, but not yet in sight. Indications at this time do not point to high purity as the path along which it will be found.

For the Metals Division the high point of the meeting was the annual lecture, this year being, "The Creep of Metals," by Daniel Hanson, professor of metallurgy, University of Birmingham, England.

Mr. Hanson described the principal phenomena of the flow and fracture of metals under prolonged loads, and also showed the relation between load and length of life. It was said that there may be a limiting creep stress at high temperatures, and that a study of deformation under load is important. The characteristics of the creep strain-time curve were discussed, and it was said that minimum creep rate or constant creep rate varies with load and temperature. Flow may be regarded as due to a running balance between strain hardening and annealing effects, which play an important part in determining behavior at elevated temperatures.

The paper, "Age-Hardening of Aluminum Alloy IV—Discussion of the Theory," by Wm. L. Fink and Dana W. Smith, of Aluminum Research Laboratories, presented no new evidence but rather a study and correlation of existing experimental data on the age-hardening of aluminum alloys. The authors arrived at conclu-

its Alloys," by Gerhard Derge and J. Warren Stewart, of Carnegie Institute of Technology, described the apparatus and methods used to record stress-strain curves during the slow extrusion of tin and its alloys with small amounts of copper (up to 5 per cent) which are used most commonly for collapsible tubes. The pressure required for extrusion at any given rate increases with the amount of copper present. Although the data were obtained under slow extrusion with conditions under careful control, they will be of value to producers of extruded soft metal products under fast commercial conditions, as the relations found in these experiments still hold at the higher rates.

A paper, "Some Properties of Low Lead-Silver Alloys Pertinent to their use as Bearings," by R. W. Dayton, of Battelle Memorial Institute, showed that bearings of a 3 to 4 per cent Pb—balance Ag alloy are extremely resistant to seizure and have the necessary physical properties to enable them to carry high loads without mechanical failure. Bonding is difficult in any way except by electro-deposition, but further work on thermal methods may result in successful bonding. It was also said that electro-deposition studies are now in progress, directed toward commercial production techniques.

"Age Hardening in Magnesium-Tin-Silver Alloys," a paper by Bruce S. Old, Bethlehem Steel Co., and John T. Norton, Massachusetts Institute of Technology, reported an investigation of the age hardening characteristics of magnesium alloys containing about 6 per cent tin and 2½ per cent silver. It was said that these alloys are susceptible to heat treatment and under the best conditions develop a tensile strength of about 43,000 lb. per sq. in. and 3½ per cent elongation. Small additions of manganese increase the resistance to corrosion in salt water but such additions affect the aging properties adversely. Hardening is due essentially to precipitation.

H. E. Stauss, of Baker & Co., reported on the "Tensile Strengths of Elevated Temperatures of Fine Wires of Some Platinum Alloys," his paper dealing specifically with short time tensile strength measurements at elevated temperatures on 13 platinum alloys of the solid solution type, in the form of fine wires. The results indicated that such alloys maintain their relative order of strengths at all temperatures. The loss in strength of such alloys in the fully annealed state tends to be linear with increase in temperature.

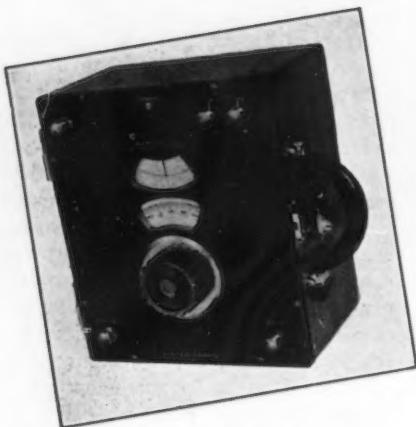


R. H. LEACH
Chairman, Institute of Metals Division

sions which are consistent with the precipitation theory originally proposed by Merica, Waltenberg and Scott, that age hardening is caused by the precipitation of particles from a solid solution, these particles being in solution at the heat treating temperatures but insoluble at the aging temperature. This precipitation causes changes in the physical and mechanical properties of the alloy, since the precipitated particles, beginning as small crystal nuclei, grow to a size sufficient to interfere with slip i.e., they make the alloy harder. Particles of colloidal size are most effective in hardening. These particles are not visible under present microscopes, but it is hoped that they may be seen by the aid of the new compound electron microscope, giving magnifications up to 100,000 diameters.

This "precipitation hardening" theory has explained many hitherto mysterious phenomena and is fundamentally responsible for the development of a host of new and useful alloys in recent years, according to the authors.

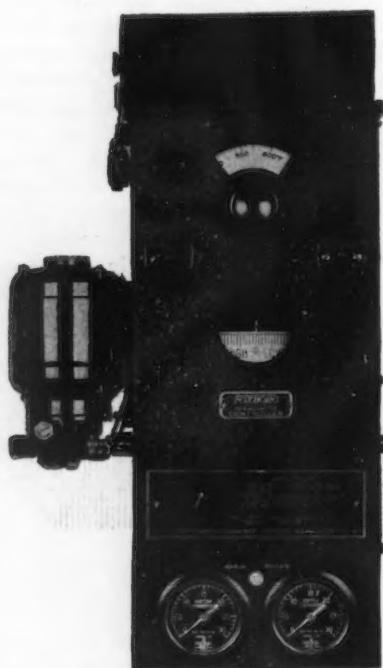
The paper, "Extrusion of Tin and



A HEATER and thermocouple in a vacuum tube, known as a Thermo-Cell, is used in place of a standard cell for current standardization in the new Lewis portable precision potentiometer pyrometer.



VERNIER scales and increased mechanical sensitivity are featured in a new Foxboro portable indicating potentiometer pyrometer.



THIS Foxboro potentiometer control pyrometer is intended for use in conjunction with valves operated by air diaphragm motors.

Recent Developments in Control

By FRANK J. OLIVER
Associate Editor, The Iron Age

A NEW method of current standardization is being used in a slide wire potentiometer pyrometer of the portable type recently introduced by the *Lewis Engineering Co.*, Naugatuck, Conn. Instead of using a standard cell for balancing the Wheatstone bridge circuit, a so-called Thermo Cell is employed. This device is a heater and a thermocouple in a vacuum, the latter having the property of reversing its emf. at a definite temperature of its hot junction as built up by the heater.

In the potentiometer method of temperature measurement by thermocouples, the accuracy attained largely depends upon the ability of the galvanometer to detect small differences of potential, a factor that is enhanced if the galvanometer resistance is fairly well matched to the circuit in which it is being used. In the conventional standard cell type of potentiometer, the galvanometer must be used in a cell circuit of several hundred ohms. By using a thermocouple of low resistance in the Thermo Cell, it is possible in the Lewis instrument to use a galvanometer of medium resistance that matches both the external thermocouple circuit and the standardizing circuit. The matched resistance is said to give a greater deflection per unit of unbalanced emf. than is possible with most suspension types of galvanometer.

The instrument is used in the same manner as a standard cell type, bringing the galvanometer needle to zero by rheostat adjustment when standardizing with the Thermo Cell and using

SEVERAL improved designs of potentiometer type recording pyrometers have been introduced in recent months, as well as some innovations in control apparatus of both the potentiometer and the pneumatically actuated types. Other aids for the heat treater include an

the slide-wire knob to balance when reading temperatures with the thermocouple.

ANOTHER new type of portable indicating pyrometer of the potentiometer type is the model 8106 announced by the *Foxboro Co.*, Foxboro, Mass. The instrument operates either horizontally or vertically with equal accuracy. Increased mechanical sensitivity is said to be inherent in the vernier type dial, which has a temperature scale measuring 17 in. on the circumference, making it possible to obtain readings to close limits. Instruments may be obtained with temperature and millivolt scales or with one scale only.

Automatic compensation for cold junction errors due to ambient temperature changes is provided by use of a cold-junction compensator coil. By reversing the coil, the instrument can be used as a source of emf. or for checking the calibration of other instruments. Standardization is accomplished with the aid of a vernier type rheostat, made with platinum-iridium contact points for resistance to corrosion and wear. The meter is contained in a welded aluminum case, finished in crystalline enamel.

Control Pyrometers

FOXBORO has also developed a new potentiometer control pyrometer for actuating air-operated valves

Heat-Treating and Process Apparatus

indicating pressure controller for furnace firing control, a cycle timer and a direct-reading gas-air ratio meter. Several new ovens and pots have been placed on the market for hardening and tempering high speed and tool steels.

applicable to gas, oil, steam, hot water and hot air heating, or brine, cold water or air cooling systems. In this instrument, by means of a fixed setting of the temperature dial and slide wire contact position, the mechanism for detecting temperature change acts directly in detecting galvanometer deflection, thus transmitting in control action the full sensitivity of the measuring system. The knife edge detecting device is said to be able to pick up a galvanometer deflection of 0.002 in., corresponding to as little as 1/3 deg. F. for some settings. Direct setting of the 12-in. scale is possible to 1/5 per cent of scale range. Temperature range is from -300 to 2800 deg. F.

The air control system consists of a positive open-and-shut air control mechanism. Valves are provided in both single and double seated types. Normal air pressure is 17 lb. per sq. in.

MODEL No. 9-TIC is a new type of direct-set indicating controller for temperature announced by *C. J. Tagliabue Mfg. Co.*, Brooklyn. It is a pneumatically actuated type in which the diaphragm valve for heat flow is regulated through an air relay, controlled in turn by a flapper and air jet. The flapper is tied in mechanically with the setting and indicating pointers of the instrument. This control can be supplied in either an on-off or throttling type. The former will open the diaphragm valve if the tempera-

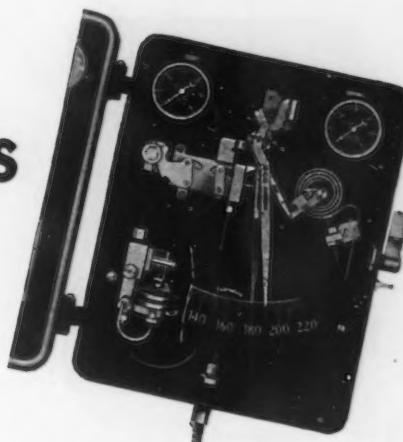
ture is slightly below the setting point and will close it if the temperature rises slightly above. The throttling type employs an adjustable flapper giving more exacting sensitivity. Both the red setting pointer and the white control pointer indicate on the 5½-in. scale. The instrument is housed in a diecast aluminum case. A pressure controller of this type is also furnished.

Furnace Pressure Controller

AIR-O-LINE furnace pressure controller is the latest product of the *Brown Instrument Co.*, Philadelphia. It is applicable for the indication and control of pressures and drafts on all types of furnaces, stills, kilns and ovens where very low differential or static pressure must be maintained. It is said to hold furnace pressures within ± 0.002 in. of water on a scale span of 0.2 in. The pointer will move 10 per cent of the scale range in 1 sec., and 100 per cent of the total range in 3 sec. Complete range may be had from -5 to +5 in. of water. Essentially this instrument is an inverted-bell type draft indicator combined with a standard Brown Air-o-Line control unit. Automatic reset and fully adjustable throttling range prevent the furnace from lining out at some point other than the control point and is said to eliminate over-correcting and cycling.

Permanent Chart for Recording Meters

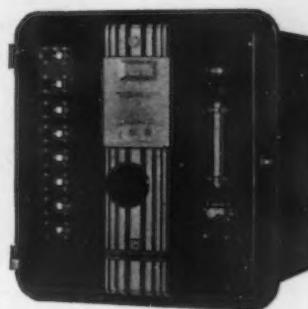
ANEW, permanent chart for recording meters, impervious to moisture, is announced by the *Permochart Co.*, Pittsburgh. It is formed of three sheets of acetate, laminated under high pressure with the chart design printed on the opaque, inner sheet, which is sandwiched in between the two transparent outer ones. The manufacturer claims that the new Permochart is the most accurate yet



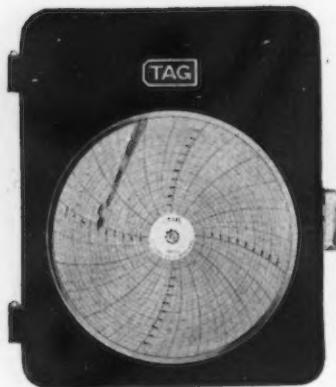
TAG Model No. 9-TIC direct-set indicating controller is a pneumatically actuated type made with both on-off and throttling controls.



To provide centralized temperature indication for scattered points in an industrial plant, the *Foxboro Co.* has introduced a new key-switch cabinet indicating potentiometer pyrometer. As many as 32 switches may be obtained on one panel, which is arranged beside the standard indicating panel containing the scale and vernier-dial knob. All connections are made from the front of the board, and the case is provided with 10 knockout openings on top, bottom and sides.



In the new *Leeds & Northrup* switchboard model temperature indicator, there is ample space for toggle type selector switches for connecting any one of a maximum of 18 couples to the potentiometer circuit. The bridge circuit is hand standardized, but has automatic reference-junction compensation, eliminating uncertainties due to circuit resistance variables. Scale can be calibrated for single or double range, the latter being illustrated. The instrument is designed for flush panel mounting.



TAG indicating, recording and controlling instruments for temperature and pressure are now available with a 9-in. diameter chart, supplementing the 10 and 12-in. sizes. The functioning of the instruments are identical. This is a product of C. J. Tagliabue Mfg. Co., Brooklyn.

devised, that shrinkage and expansion are reduced to a minimum and that it is much more durable than the original Permochart. The writing surface, though smooth and hard, is flexible and resistant to damage from pen penetration. Each day's recordings can be wiped off with a damp cloth.

Heat-Treating Furnace

ANO. 3 size model Y electric furnace has been developed by the *Sentry Co.*, Foxboro, Mass., for high speed steel hardening up to 2500 deg. F. Like the smaller Nos. 1 and 2 sizes, the No. 3 is a full muffle furnace with three heating elements above the muffle and three below. It employs air-cooled terminals. These and all electrical contacts are shielded.



TWO flow metering elements, one for air and the other for gas, are incorporated in this ratio meter. The intersection of the pointers of the two meters indicates the relation between the two flows. If they cross in the area to the right of the zero line, the intersection will indicate the percentage of excess air. Conversely, if they cross in the area to the left, it will show the air deficiency. This meter may be used on all types of heating equipment, whether it is equipped with automatic fuel-air ratio control or is manually operated. Made by the *Askania Regulator Co.*, 1603 S. Michigan Avenue, Chicago.

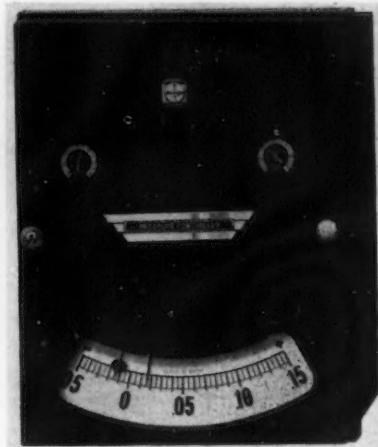


SENTRY No. 3 model Y electric furnace has about twice the production capacity of the No. 2 size when used for the hardening of smaller high speed steel tools. Designed for use with the Sentry diamond block system of tool hardening.

The removable silicon carbide muffle chamber is 8 1/8 in. wide, 4 in. high and 16 in. deep, and will accommodate most of the standard sizes of Sentry diamond blocks. With the diamond block method of atmospheric control, it is claimed that tools are not scaled, decarburized or reduced in size, but come out of the furnace uniformly hardened and with a pleasing gunmetal finish.



THE new American Gas Furnace tempering unit has a pot 11 in. in diameter by 10 1/2 in. deep. Temperature range up to 1000 deg. F. for salt baths. A larger size is also made.

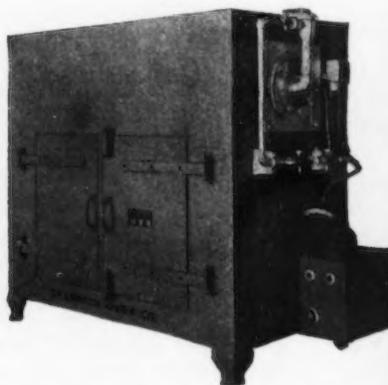


THE Brown Air-O-Line furnace pressure controller is for the indication and control of low range pressures and drafts encountered in the firing of various types of industrial furnaces.

The No. 3 furnace will heat from cold to 2350 deg. F. in 75 min. Current consumption at 2350 deg. is between 5 1/2 and 15 kw., depending upon the amount of work hardened. Maximum rating is 26 kw., and the furnace is wired for direct connection to a 220-volt line.

Tempering Pot

BETTER insulation, greater ease in controlling and more uniformity of work are some of the features of an improved tempering pot for tool room use recently put on the market by the *American Gas Furnace Co.*, Elizabeth, N. J. Furnace may be used for temperatures ranging from 400 to



HEAVILY insulated, this type CF gas-fired oven, with operating range from 225 to 950 deg. F., is recommended for steel tempering and drawing operations by its maker, the *Despatch Oven Co.*, 622 Ninth Street, S. E., Minneapolis. Heated air is introduced into the oven at the left side through a series of adjustable baffles and travels crosswise to the recirculating ducts on the right side. A high capacity fan assures positive and rapid air travel around and through the parts. The gas heating system is incorporated into the design. Oven is built in sizes from 19 x 19 x 19 in. up to large truck loaded units.



A LARGE cover that makes it easier for the operator to remove materials from the drum, together with a smaller outside diameter for less floor space, are features of the new 100-lb. containers for Holden Light Case and Hard Case, the improved carburizing compounds made by the A. F. Holden Co., New Haven, Conn. These salts contain a new reactive carbon with carbonates which act on a percentage basis so that CO is generated not only from sodium cyanide but from the by-product carbonate as well.

1000 deg. F. for oil and salt baths. It is regularly equipped with a mercury thermometer having a scale range from 200 to 900 deg. An insulating lining reduces the heat storage to the point where it is negligible to prevent overriding of the temperature.

A bottom burner, with top venting, gives uniform heating. This burner is supplied either to use air at 1 lb. per sq. in. pressure and gas at line pressure or to use an atmospheric or bunsen type burner. Maximum gas consumption is 60 cu. ft. per hr. of 525 B.t.u. gas and only 20 cu. ft. per hr. is needed for maintaining a temperature of 500 deg. with a smaller pot.



THE new Busch Metaphot is a combination microscope and photographic camera for metallurgical use.

Pots either 11 in. in diameter by 10½ in. deep or 17 in. diameter by 12½ in. deep can be furnished. Work is handled in a wire mesh basket.

Metallurgical Microscope and Camera

A METALLURGICAL microscopic and photographic camera have been assembled into one permanently aligned unit in the new Busch Metaphot, recently exhibited by the George Scherr Co., 128 Lafayette Street, New York. A feature is the patented Vario-Ocular, a device that changes the magnification of any eyepiece opti-



RIES 2800 vernier-set timer is a low priced instrument for timing furnace operations, purging gas-fired furnaces, cycling molding and extrusion presses and for use with automatic machinery. Four arrangements of load circuit are possible, selected by the adjustment of two slides and by the location of bridge connections. Silver contacts carry 30 amp. at 110 volts a.c. Four dial ranges are supplied, from 0 to 2 min. up to 0 to 60 min., with corresponding scale divisions of 1 sec. to 30 sec. A scale division setting can be accurately subdivided by means of a vernier. Motor is a telechron type. This is a new product of the Automatic Temperature Control Co., 34 E. Logan Street, Philadelphia.

cally at the turn of a dial. The ground glass remains in a fixed position in front of the observer. Standard magnifications of 100, 200, 500, 1000 and 2000 diameters can easily be obtained.

The lamp house can be tilted for inspection of machined or finished surfaces. Stage of the microscope is of the inverted type and will accommodate polished or fractured specimens of any reasonable size or shape. The type of illumination can be changed instantly from bright field to dark field, vertical or oblique illumination.

1938 Steel Workers Only 3% Below 1929

DESPITE the fact that output of steel ingots in 1938 was nearly 50 per cent below the tonnage produced in 1929, the average number of employees on the payrolls of the industry last year was only 3 per cent below 1929, according to data compiled by the American Iron and Steel Institute.

Total payrolls of the industry last year were only 27 per cent below the total for 1929. Compared with 1937, steel production last year dropped 44 per cent, while employment and total payrolls were down 23 per cent and 37 per cent respectively.

During 1938 an average of 443,000

men were employed by the industry, as against 458,000 in 1929 and 572,000 in 1937. Steel payrolls last year totaled \$613,000,000, compared with \$841,000,000 in 1929 and with \$976,000,000 in 1937.

Production of open-hearth and bessemer ingots last year was 27,839,000 gross tons, as against 54,312,000 gross ton in the peak year 1929 and 49,503,000 in 1937.

Steel employment in 1938 was 8 per cent higher than at the beginning of the five-year period 1934-1938, and payrolls were 34 per cent higher. Over the same period production rose 8 per cent.

Steel employment in 1934 averaged 409,000, and payrolls totaled \$458,000,000. Steel output in 1934 amounted to 25,599,000 gross tons.

Hourly earnings of wage earners in 1938 averaged 83c. per hr. as against 82c. in 1937, 63c. in 1934 and 65.4c. in 1929.

Tool Engineers to Hear J. C. Cotner

CLEVELAND — The Cleveland chapter of the American Society of Tool Engineers is scheduled to hear J. C. Cotner, vice-president and chief engineer of the Logansport Machine Co., Logansport, Ind., March 24. His topic will be "Fundamentals of Hydraulic Applications," and the lecture will be supplemented with moving pictures of hydraulic applications and a display of developments in valves and cylinders. The meeting will be held at the German Club, Cleveland.

THIS WEEK ON THE ASSEMBLY LINE

By W. F. SHERMAN
Detroit Editor

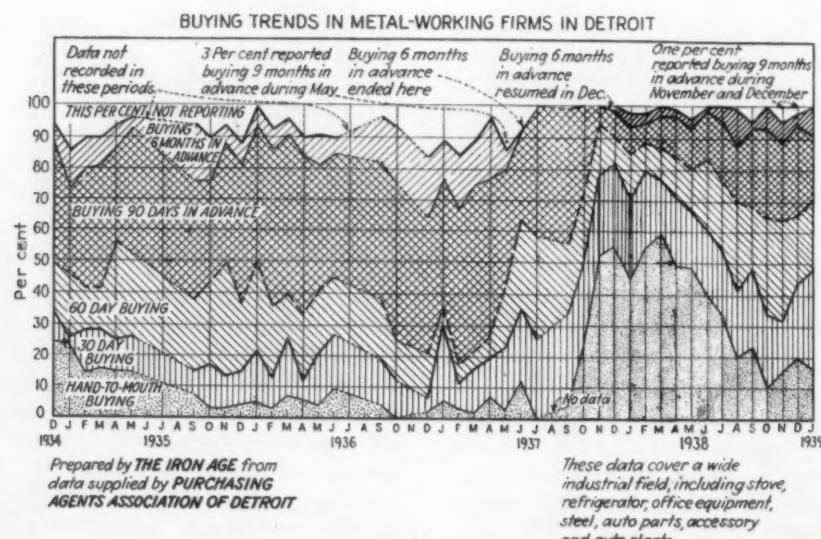
... Auto Show moved ahead three weeks to Oct. 15, and Truck Show abandoned ... Seasonal slackening reduces auto output to 79,860 ... Packard official cites depleted stocks as good omen of spring activity ... Studebaker celebrates 87 years without major labor trouble.

DETROIT—With the announcement of the opening date for the 40th annual Automobile Show, the chronological order which the automobile industry will follow in the next year has been outlined. The year will be marked principally by the fact that new models will be introduced earlier than ever before.

The 1940 show will open Oct. 15 at Grand Central Palace, New York, the show committee of the Automobile Manufacturers Association has announced. The date selected is three

weeks earlier than last year. Another important change in the program is the announcement that the new automobile show will feature an exhibit of delivery wagons and motor trucks and a showing of antique cars, covering 35,000 ft. of floor space. This will be the only exhibit of trucks and commercial vehicles in New York this year, according to the committee. Following the announcement, truck manufacturers in the AMA declared against further national motor truck shows.

In these two announcements there



are actually two important statements of policy on the part of the automobile manufacturers. First, in again announcing a fall showing, the manufacturers go definitely on record against the agitation of a considerable group of dealers who favor return to January introduction of new models. The National Automobile Dealers' Association is waging a fight to have the date of introduction changed from fall to January, declaring that "automobile dealers have become convinced that the fall introduction has placed a burden upon them which more than offsets any advantages that may have accrued to other sections of the industry. Primarily, it has resulted in requiring them to carry excessive inventories of used motor vehicles in stock during the winter months."

On this point, the AMA declared in its announcement of the Oct. 15 date, that the earlier show would give dealers a longer selling period in the fall to dispose of used cars. The report of the show committee said also "a major consideration in the selection of this date was the contributions which the fall show will make to the stabilization of employment in both the automobile industry and its network of supplying industries."

It is also generally acknowledged by dealers and manufacturers that the fall date has been beneficial in providing two peak car-selling seasons instead of one. The issue is hardly settled, however, except for this year.

The abandonment of the national truck show is explained because "the records over a period of years prove conclusively that national motor truck shows, however well managed, are not sufficiently productive of sales," according to the truck manufacturers'.



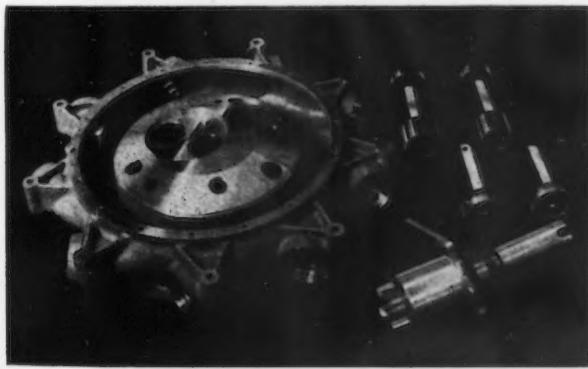
Gear grinders like this, and jig borers, die sinkers, surface grinders, lathes, vertical shapers are only a few of the many precision machine tools made by Pratt & Whitney.



"Pratt & Whitney"

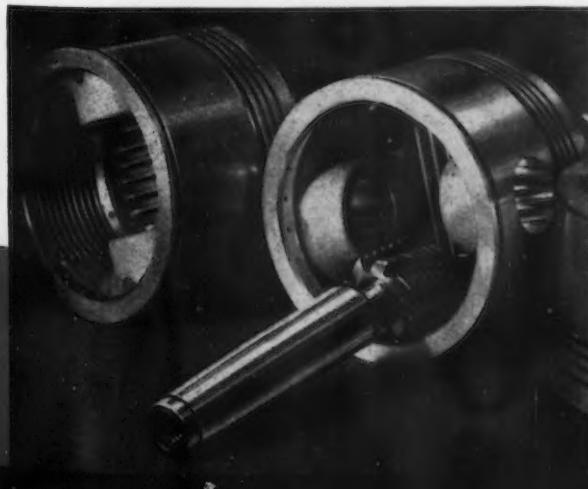
Division Niles-Bement-Pond Co. • • • HARTFORD, CONN.

Since 1860 that name has meant Precision MACHINE TOOLS... SMALL TOOLS... GAGES



These gages are typical of the wide variety we make for accurately governing aircraft parts production, as well as for most other industries.

Below is a cutter—one of thousands of all types of precision small tools turned out by Pratt & Whitney craftsmen.



BEHIND that name are 250,000,000 man hours, or if you like the other way better—79 years—with every day and hour devoted to putting the finest quality and precision into our machine tools, gages or cutting tools. Behind every Pratt & Whitney product is that background of knowledge and experience. It is a Pratt & Whitney tradition that every tool bearing that name must be first class, and as accurate as fine craftsmanship can make it.

Accuracy is the vital factor in building aircraft. Pratt & Whitney accuracy has won its place in aircraft manufacture. Pratt & Whitney machine tools, gages and small tools have been tried by rigid aircraft standards and proved good.

Take advantage of those 250,000,000 man hours of experience which have proved beyond any doubt that accuracy pays dividends. When next you need machine tools, small tools or gages . . . remember the name "Pratt & Whitney."

"There is no better paying investment than the right tools for the job!"

statement. They also announced a policy of continuing to display trucks selectively at vocational and automobile shows.

Of course, as stated here weeks ago, the staging of the two World Fairs, at New York and San Francisco, is having an effect on the auto exhibits. Manufacturers were desirous of displaying 1940 models as early as possible at the fairs. They probably will do so by mid-summer. For a while there was serious debate about having an automobile show at all, one opinion being that displays at the fairs would be sufficient.

Assemblies in Seasonal Decline

Seasonal slacking of assembly lines resulted in a reduction of the total number of automobiles assembled in the last week to 79,860 from the previous week's 84,500, according to Ward's Automotive Reports. The total is still well above the corresponding week of a year ago when only 59,100 cars were assembled.

A major reduction was that of the Ford Motor Co. which operated on a

four-day schedule to assemble 16,000 cars. For the past five weeks Ford has turned out 21,000 units each week on a five-day basis. There was a corresponding slump in Lincoln-Zephyr output from 750 units to 600. Chevrolet, after five weeks at the 20,500 level, slipped down to 20,000. Plymouth, for the second successive week, turned out 9800 cars.

Because current stocks of new cars are low, increased automobile buying in the spring will be almost immediately reflected in accelerated factory activity, according to M. M. Gilman, vice-president and general manager of Packard Motor Car Co. "There are now less than two-thirds as many finished cars in the hands of dealers, in automobile factories or in transit, as there were at this time a year ago," he declared. He said that a higher rate of production would result, even if spring buying were no greater than last year. "If buying quickens beyond the forecast of a few months ago, stocks may be so far depleted that factories would have difficulty catching up," he predicted. "A

further encouraging factor," he said, "and one which will have an important bearing on this year's spring automobile business, is the low used car inventory."

New passenger car registrations in January are running about 20 per cent above corresponding figures for a year ago, according to a preliminary report from R. L. Polk & Co. Truck registrations show an increase of more than 13 per cent. Figures are based on the returns from nine states.

Buick Breaks Sales Record

Buick, still riding high on the crest of the sales wave, broke all company records for January in the month just past. Retail deliveries in the United States gained 37½ per cent over last year. The company moved into February with continued record-breaking sales, volume showing consistent gains over January and the corresponding 1938 season. Retail deliveries in the first 10 days of the month totaled 3717 units, 8 per cent higher than in the first 10 days of January and 37 per cent higher than in the first 10 days of February last year.

At the same time, used car stocks were reduced during this period, according to W. F. Hufstader, general sales manager. He said that used car sales totaled 8688 against 7933 in the first January period and 8133 in the corresponding 10 days of February last year.

Other Gains Being Made

Other companies report similar or greater gains over a year ago. Pontiac retail deliveries in January showed an improvement of 64.3 per cent. Studebaker records indicate an increase of 57 per cent and also offer an interesting comparison between January and the month preceding. The seasonal contraction from December amounted this year to only 5.1 per cent. A year ago, the decline in January from December sales amounted to 36 per cent. Chevrolet continued its advance, gaining 31.7 per cent over last January. Moreover, this represents the third month in which the gap with the preceding year widened markedly. In November, for instance, the advance was slightly more than 6 per cent above the preceding November; in December it was 25.4 per cent and in January 31.7 per cent.

For the seventh time in the past eight years, Chevrolet led in passenger car registrations in 1938, it is revealed in a study of figures from all states except Wisconsin, where the state law precludes possibility of getting ac-

THE BULL OF THE WOODS

BY J. R. WILLIAMS



curate registration figures. During W. E. Holler's fifth year as general sales manager, Chevrolet took first place, both in passenger car and truck, leading the field by more than 100,000 units. A sidelight on the company's sales performance during 1938 is furnished by the fact that its sales declined only 38.6 per cent from 1937 during the period when the industry as a whole showed an average decline of 44.7 per cent.

Even overseas sales are on the upward path. Sales of General Motors cars and trucks to dealers in the overseas markets during January totaled 30,878, an increase of 3.4 per cent over sales in January, 1938.

January sales of General Motors cars and trucks within the United States from all sources of manufacture total 152,746, compared with 94,267 in January a year ago. Sales in December were 187,909.

Studebaker 87 Years Old

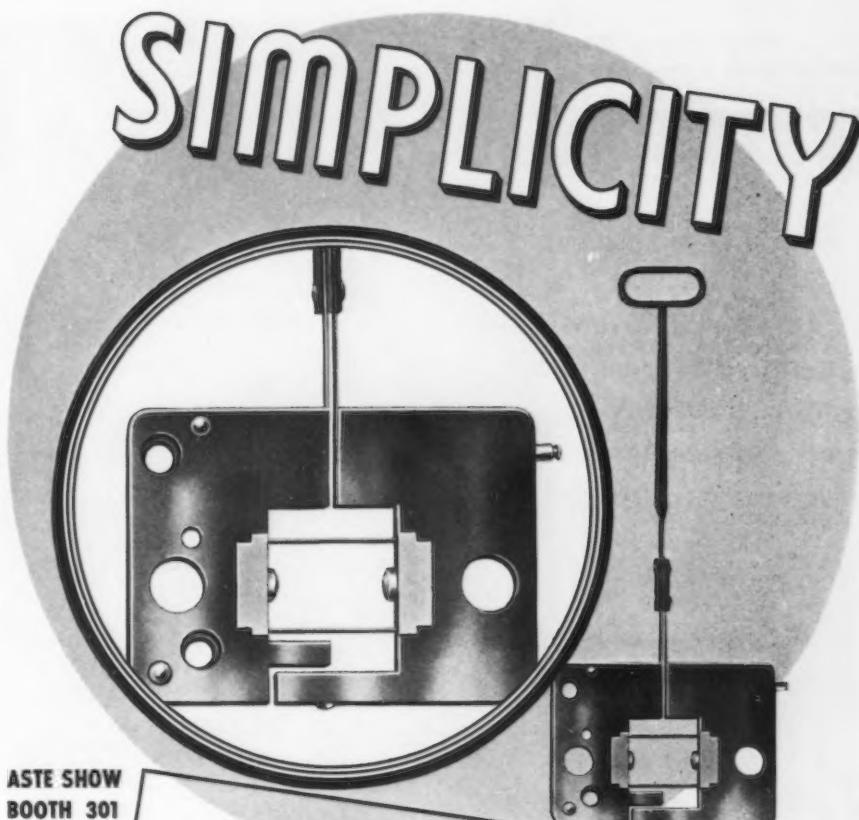
Studebaker Corp., which is expected to announce a new light six in March, celebrated its 87th birthday on Feb. 16, commemorating an unbroken record of harmonious labor relations with a party for fathers and sons employed by the company. Paul G. Hoffman, president, attributed Studebaker's long record without a major labor disturbance to the continuous employment provided by the plant. In a statement to his workers, he said that the average length of employment of men now on the payroll is 11.06 years, more than twice the average for the auto industry as a whole, 5.9 years. Included on the payroll are 55.7 per cent of men more than 40 years old.

Last week the 27 millionth Ford car was assembled at the branch plant in Richmond, Cal. The car was placed in the Golden Gate Exposition.

Prelude to the spring sales campaign of Pontiac Motor Co. will be a million dollar advertising drive during March, April and May. This will be the biggest campaign in years and follows the largest Pontiac advertising expenditures for January and February in five years.

January Refrigerator Sales Set New Record

THE Mansfield works of the Westinghouse Electric & Mfg. Co. shipped more electric refrigerators last month than in any other January in the company's history, exceeding shipments for the entire first quarter of 1938, R. C. Cosgrove, manager of household refrigeration, announced.



Simplicity is one of the greatest assets a mechanism can have, especially when its function is precision measurement. Like the modern precision gage block, the accuracy of which is related to the ever constant light wave, the Sheffield frictionless Reed Mechanism is incredibly simple—the simplest device yet developed. Notice in the close up above that the metal reeds have no contact with one another. They cannot rub or develop friction in operation. This reed principle provides the following advantages:

1. It is mechanically positive.
2. It eliminates all gears, ratchets, levers, knife edges, etc.
3. It never requires an expert or wizard to adjust it.
4. It has no backlash or lost motion.
5. It is constant and instantaneous in action.
6. It doesn't lose adjustment.
7. It is rugged and accurate.
8. Unless you throw it out of the window, or give it extremely severe abuse, it doesn't need repairs.
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THIS WEEK IN WASHINGTON

... Federal Trade Commission's testimony on steel scheduled to start before TNEC on Feb. 27 ... Administration bill aims at slash in volume of U. S. questionnaires to business ... Justice Department may sue steel, machinery industries on like bids.

By L. W. MOFFETT

Washington Editor, *The Iron Age*

WASHINGTON — Testimony of the Federal Trade Commission regarding its experience with the steel industry is scheduled to start before the Temporary National Economic Committee the week beginning Feb. 27. The steel industry will be dealt with after the commission presents a general picture of its activities under the Federal Trade Commission and Clayton Anti-Trust acts. It is expected that a day or two will be required to present the general case after which steel will be taken up.

Under the present plans it is expected to dispose of discussion of the steel industry within a day or so also. The time required, it was pointed out, is dependent on the scope of the testimony which apparently has not been determined. It was said that if the presentation is confined to evidence by FTC economists and investigators it will not be necessary to extend the time beyond the period indicated. Steel witnesses may be subpoenaed and a longer time may be necessary. It was stated that the FTC will give testimony on the strength of "new studies" it has made of the steel industry. The nature of these "studies" has not been disclosed. As stated in *THE IRON AGE* of Feb. 16, page 58, testimony also is expected to deal with the basing point system, identical bidding and mergers.

Despite assertions to the contrary, belief still exists that some of the FTC testimony will overlap the in-

formation being gathered through the two TNEC questionnaires relating to prices and distribution in the steel industry which were sent out jointly by the Department of Justice and the Federal Trade Commission, since the information requested has a bearing on the basing point issue. At the same time there is the implication that the commission will not be permitted to run away with the ball but that the testimony will be kept within bounds by the TNEC in an attempt to prevent any conflict or overlapping.

Information received through the two joint questionnaires, it has been pointed out, will be the subject of extensive hearings, the dates for which have not been fixed. It is estimated, however, that this phase of the TNEC inquiry will not begin for several months.

Action on Wages Unlikely

Meanwhile, it was a foregone conclusion that the TNEC will do nothing to defer the Labor Department's steel wage order on the ground that it may foster monopoly, as was suggested last week by Roberts B. Thomas, counsel for the committee representing 42 small Eastern iron and steel producers. Mr. Thomas made the request that the TNEC immediately investigate the effect of the steel wage action upon monopoly in a letter to Secretary Henderson but it has been pointed out that it would be unusual for a Governmental agency to override the action of a Cabinet member.

The question of requiring the small Eastern mills to pay a 62½c. minimum wage rate had already been brought to the attention of the TNEC and it has been generally expected that the allegation that the small companies' inability to pay the required minimum rate, thereby eliminating them as competitors, would eventually be fitted into the TNEC inquiry along with other problems in due time. At any rate, it is conceded that long before the TNEC could take action, the steel wage order will have become effective on March 1.

Mr. Thomas in his letter said he presumed that Bethlehem Steel Corp., being a large seller of supplies to the Government, will be forced to pay the 62½c. hourly wage rate fixed by the Secretary of Labor. All of the companies represented by him, he said, are forced to seek workers in the same labor market with Bethlehem, which can "well afford to do so but many of my clients will not longer be able to compete." Insisting that the change will mean "severe hardship to all" and "disaster to many," counsel for the Eastern producers told the TNEC that "the real effect of the change will be to force the work into the hands of the large dominant companies."

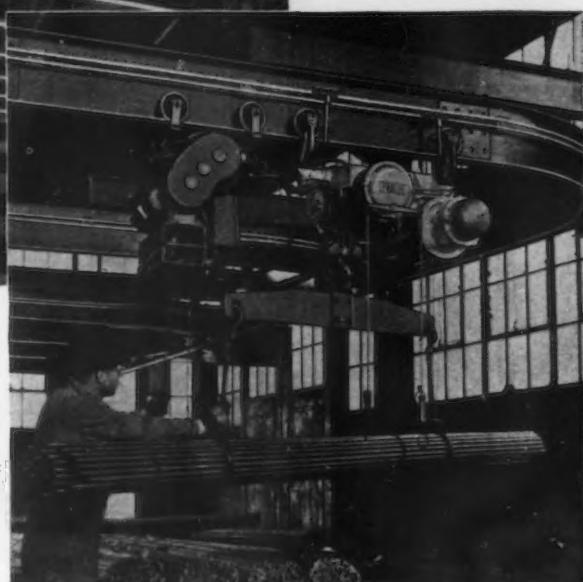
Companies Represented

"In seeking to force a raise on Bethlehem, the Department of Labor is handing them a greater measure of control of the Eastern market than ever before," Mr. Thomas said. The companies for which Mr. Thomas spoke are:

Acme Steel & Malleable Iron Works, American Car & Foundry Co., American Tube & Stamping Co. (subsidiary of Stanley Works), Atlantic Wire Co., E. & G. Brooke Iron Co., Buffalo Bolt Co., Burden Iron Co., Carpenter Steel Co., Central Iron & Steel Co., Chateaugay Ore & Iron Co. (subsidiary of Delaware & Hudson Co.), Cohoes Rolling Mill Co., Henry Dillston & Sons, Inc., Eastern Rolling Mill Co., Eckels-Nye Steel Co., Ivins Steel Tube Works, Empire Finished Steel Corp., Harrisburg Steel Corp., Heppenstal Co., Johnson Steel & Wire Co., E. J. Lavin & Co., Logan Iron & Steel Co., Lukens Steel Co., Midvale Co., Milton Mfg. Co., Phoenix Iron Co., Pine Iron Works, Poor & Co., Inc., George W. Prentiss & Co., Rustless Iron & Steel Corp., Simonds Saw & Steel Co., South Chester Tube Co., Sweet's Steel Co., Tonawanda Electric Steel Casting Co., Tremont Nail Co., Troy Furnace Corp., Ulster Iron Works, Wallingford Steel Co., Alan Wood Steel Co., Worcester Pressed Steel Co., Worth Steel Co., G. F. Wright Steel & Wire Co., and Wrought Iron Co.



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THE IRON AGE, February 23, 1939—55

Labor Board Given Questions on Steel Wage Deductions

WASHINGTON — Revision of the Walsh-Healey Public Contract Act may be asked by the Department of Labor to clarify the question of whether legitimate deductions customarily made by employers from employees' pay envelopes can continue to be made in instances where the deduction brings the wages paid below the prescribed minimum rate.

Several steel companies raised this issue in briefs and in testimony presented to the Public Contracts Board while the steel-wage negotiations were under way and some companies are still attempting to obtain further clarification of the matter.

The act specifically prohibits any practice reducing the net wage below the established minimum and deductions for community chest contributions, group insurance premiums, "kick-backs," medical expenses and rent are taboo under the law. Such de-

ductions, however, are not banned as long as the net wage of the employee does not fall below the established minimum wage.

Authority is Doubted

This provision has been relaxed somewhat by an informal ruling of the administrator under which deductions for group insurance premiums are permitted in cases where the deductions reduce the wage below the prescribed minimum rate if payment of this insurance premium is voluntary on the part of the employee and if the insurance company is a bona fide and recognized company.

There is some doubt that the administrator has the authority to make even an informal ruling in this regard and it is understood that he has expressed sympathy with the problem, indicating a desire to urge incorporation in the pending Walsh bill a change of the law to broaden and clarify the administrator's power. If passed, such a revision would either authorize other legitimate deductions such as payments for credit unions and other deductions customarily made by the employer or give the administrator

unquestioned authority to issue clarifications.

Social Security Taxes

A similar problem exists under the Fair Labor Standards Act but this law apparently is more flexible. The Wage-Hour Administrator has expressed the opinion that deductions for employees' taxes, such as social security taxes, and for union dues pursuant to a collective-bargaining agreement with bona fide union representatives are permissible as well as other deductions customarily made if there is no possibility that the employer is thereby permitted to make a profit.

Section 3(m) of the wage-hour law defines the term "wage" as including "the reasonable cost, as determined by the administrator, to the employer of furnishing such employee with board, lodging, or other facilities, if such items are customarily furnished by the employers."

Administrator Andrews has ruled that the deductions listed above can be made whether or not they technically constitute "board, lodging or other facilities."

Test of Keystone Beam Steel Floor Published

WASHINGTON — The results of tests conducted by three Bureau of Standards engineers on specimens of cellular sheet steel floor construction, manufactured by the H. H. Robertson Co., of Pittsburgh, are reported in a booklet prepared by the bureau. As part of the program on structural materials for low-cost housing, the specimens, fabricated with 18 x 18 in. panels covered by a concrete fill and a "Hubbellite" composition finish floor, were subjected to transverse, impact, and concentrated load test and the results are shown graphically in the booklet, copies of which are available from the Government Printing Office at 10c. each. The product tested is known as the "Keystone Beam Steel Floor."

C. & O. Tariff Schedule On Coke Suspended

WASHINGTON — The Interstate Commerce Commission has suspended until Sept. 15 Chesapeake & Ohio tariff schedules which propose to increase from \$2.47 to \$3.55 per ton rates on coke from Ansted, Elverton, Fire Creek, Kaymoor and Sewell, W. Va., to Jeffersonville, Ind.



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**Government Steel Orders
For Week Total \$306,482**

WASHINGTON—Contracts for iron and steel products awarded under the Walsh-Healey Public Contracts Act during the week ended Feb. 11 totaled \$306,482.84. Contracts for machinery awarded during the same period totaled \$826,781.23. Details, including related contracts, follow:

Iron and Steel Products

The Kaul Clay Mfg. Co., Toronto, Ohio, iron pipe	\$11,297.20
Bethlehem Steel Co., Bethlehem, Pa., steel plate	71,230.47
Alan Wood Steel Co., Conshohocken, Pa., steel plates	70,676.45
The American Rolling Mill Co., Middletown, Ohio, steel	11,833.12
Vulcan Rail & Construction Co., Maspeth, L. I., N. Y., arch, iron and hand rail	11,740.00
Capitol Steel & Iron Co., Oklahoma City, Okla., structural steel	15,907.70
Pacific Iron & Steel Co., Los Angeles, radial gates	12,695.00
P. Wall Mfg. Supply Co., Pittsburgh, oilers	Indefinite
Steel & Alloy Tank Co., Newark, N. J., buoys	12,434.00
Steel & Alloy Tank Co., Newark, N. J., buoys	18,630.00
The McKay Co., Pittsburgh, buoy chain	22,830.29
Baldt Anchor, Chain & Forge Corp., Chester, Pa., buoy chain	10,434.95
American Chain & Cable Co., Inc., Bridgeport, Conn., buoy chain	18,749.74
The Jeffrey Mfg. Co., Columbus, Ohio, conveyor chains	18,023.92

Non-Ferrous Metals and Alloys

North American Smelting Co., Inc., Philadelphia, solder, zinc, aluminum	Indefinite
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Machinery

Hardie-Tynes Mfg. Co., Birmingham, Ala., compressors	\$41,070.00
Caterpillar Tractor Co., Peoria, Ill., tractors	45,710.00
Caterpillar Tractor Co., Peoria, Ill., engine assy.	36,616.24
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, broaching mach.	16,588.00
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, broaching mach.	41,628.00
Baldwin Southwark Corp., Eddystone, Pa., plate bending mach.	58,900.00
Ace Fastener Corp., Chicago, paper fastening mach.	Indefinite
Dayton-Dowd Co., Quincy, Ill., pumps	38,595.00
Buffalo Pumps, Inc., Buffalo, N. Y., pumps	305,400.00
Logan Co., Inc., Louisville, Ky., conveyors	52,799.00
Thomas Somerville Co., Washington, D. C., valves	16,074.99
American Machine & Metals, Inc., N. Y. C., centrifugals	173,400.00

Paper on Cast Iron's Elasticity Published

WASHINGTON—A research paper on "The Elastic Properties of Cast Iron" prepared by Alexander I. Krynnitsky and Charles M. Saeger, Jr., of the Bureau of Standards has been published by the bureau. Copies are obtainable at the Government Printing Office at 15c. each, the Department of Commerce announces.



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It also features a high carbon ground piston rod guided in a bronze bushing. This is one piston rod which will not buckle! In addition, there is an extra capacity oil reservoir with an automatic oil seal that prevents leakage. Once the oil is in, it stays there. And as a final indicator of the Yale

Release Check's quality manufacture, there is the highly precisioned automotive type piston ring.

With this check on the job the load is never dropped—it's gradually lowered!



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Industry Seeks Relief from Flood of U.S. Questionnaires

WASHINGTON—With the number of questionnaires and requests for statistical data reaching a new high since the advent of the Temporary National Economic (anti-monopoly) Committee, a move is under way in Congress to relieve business from the burden of unnecessarily

duplicating information required to be filed with Government agencies.

While the movement thus far is largely confined to the Republican side, an Administration bill, representing the viewpoint of the Central Statistical Board, the Government's coordinator of statistical gathering

agencies, is being drafted in accordance with a report submitted to Congress on Jan. 10 by President Roosevelt. The report was prepared by the board after Mr. Roosevelt announced on May 16, 1938, that he was "concerned over the large number of statistical reports" required from business and industry, and that the board should make a study and report with recommendations.

Nation of Bookkeepers

Some Congressional members insist that the number of questionnaires and requests for statistical information can never be curtailed until the number of Federal agencies are drastically reduced but Representative Dirksen, Republican of Illinois, has declared himself in favor of abolishing the statistical board on the ground that it has failed since it was created five years ago to reduce the number of requests for business information.

"We are making a nation of bookkeepers out of our people and keeping them so busy answering questions from Government institutions and agencies that a lot of them scarcely have time to make a living," the Congressman said in a House speech. ". . . A businessman told me . . . that he received a questionnaire that will take his firm at least three months to complete and it is likely to cost \$15,000 to provide the answers for it.

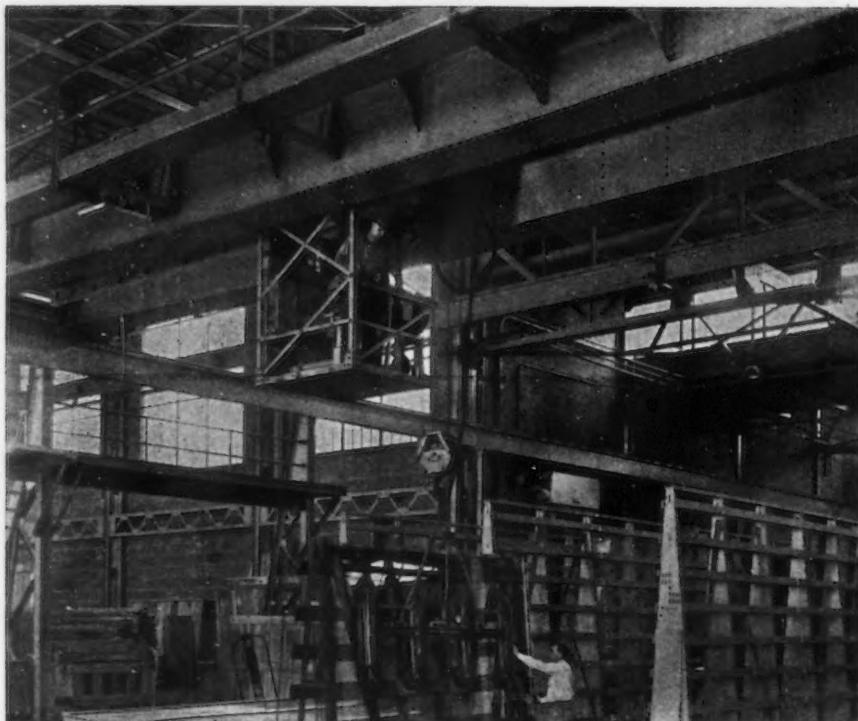
"You cannot laugh this sort of thing off. It has become a tremendous and onerous burden on business and industry. Congress will have to make a determined effort to see that this burden is diminished somewhat."

Adds to Bewilderment

Mr. Dirksen conceded that statistics to be furnished the Government are a necessary part of the economic system but added that "we have so much duplication and unnecessary folderol today that it just adds to the nation's bewilderment." He reminded economy-conscious House members that the more statistics required, the greater the expense and the greater the number of employees on the Federal payroll.

Representative Gerald W. Landis, a new Republican member of Congress from Indiana, would approach the problem by broadening the powers of the Central Statistical Board by putting teeth in the law to require all Government agencies gathering statistical information to comply strictly with requirements laid down by the board. Under the measure, the board would scrutinize all information forms to be sent out by Government depart-

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ments "to determine the extent to which such forms require unnecessary duplication of information filed with Government agencies" and the various agencies would be required under a duty imposed by the law to cooperate and if necessary to modify their information forms with a view to relieving organizations affected.

Agency Examines Questions

The board, which was created by executive order in August, 1933, to promote economy and efficiency and to eliminate unnecessary duplication in gathering Government statistics, has limited power to correct at least some of the defects and several agencies have been cooperating with the board since its inception. Among the newer Government establishments soliciting information from business is the TNEC which has closely adhered to the policy of submitting its questionnaires to the board for review.

A check-up of the two Federal Trade Commission questionnaires sent out to the steel industry last November and December reveals that only the first information form, which sought information on the financial structure of steel companies, was submitted to the board for approval. The second questionnaire, covering organization of firms in the industry, was never transmitted to the board before being dispatched to industry members, it has been learned. No reason has been advanced for the FTC's failure to comply with the usual Government practice of routing proposed questionnaires through the CSB for suggestions and approval but it is understood that the board found the first FTC information form sent to the steel industry a fertile field for exercising its prerogatives. The two steel questionnaires distributed by the FTC are separate and distinct from the steel industry information forms sent out through the TNEC jointly by the commission and the Department of Justice.

97,000,000 Returns

The board reported to President Roosevelt on Dec. 31 that there were 97,000,000 returns filled on Federal administrative forms of all kinds during the fiscal year 1938 and that Governmental requirements for reports and returns "impose a burden on respondents which is, in part, unnecessary and which can to some extent be lightened." Board Chairman Stuart A. Rice recommended among other things that provision in law be made to relieve agencies from asking for data if "substantially equivalent in-

formation" is on hand in the offices of some other Federal agency. Also, a company which had already filed information with a Governmental agency would not be required to submit duplicate information at a later date unless the statistical coordinating agency found upon examination that the duplicate request was necessary.

Protection Needed

Reaction from business groups to the recommendations have been limited to the suggestion made by the board

that information collected on a confidential basis also be made available to other Governmental agencies under "rules designed to afford proper protection." The board has conceded that unless "proper protection" could be afforded such interchange of confidential information between agencies would not be justified. On the other hand, it has been pointed out, any law passed carrying out these recommendations would be to some extent ineffectual unless such a provision were included.

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Stream Pollution up to Industry, Roosevelt Says

WASHINGTON — President Roosevelt told Congress last week that in any program aimed at eliminating stream pollution the projects needed are chiefly treatment plants for industrial waste and municipal sewage and that "the responsibility for them rests primarily with municipal government and private industry."

Transmitting a report from the National Resources Committee, which estimated that an expenditure of \$2,000,000,000 during the next 10 to 20 years by both public and private agencies may be necessary to abate the more objectionable cases of pollution, Mr. Roosevelt recommended that Congress reconsider the whole subject of stream pollution.

Several stream pollution control bills are pending in Congress and it is generally expected that one will be passed at this session. Representatives Spence of Kentucky, Parsons of Illinois and Bland of Virginia have introduced bills following substantially along the lines of the Barkley-Vinson measure which passed both Houses last session but which was vetoed by the President on the ground that allocations of Federal funds to the states for approved projects were not required to be given consideration in the annual budget figures along with other contemplated expenditures.

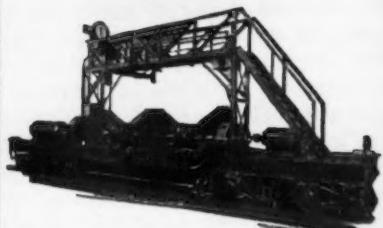
The Barkley-Vinson bill and the pending measures are all catalogued as "mild" forms of control, embodying provisions to which industry has not taken exception.

In addition to meeting the objections raised last session by the President's veto, they propose to establish a division of water pollution control in the Public Health Service whose job would be to encourage cooperative activities among the states including the enactment of uniform laws and interstate compacts in the interest of eliminating pollution. This would be supplemented by a system of Federal grants-in-aid and loans for approved projects in the various states.

Japan May Extend Law For Duty-Free Pig Iron

TOKYO—The Tokyo *Asahi* reports that the Japanese Government is planning to extend for two more years the law providing for exemption from the import duty on pig iron imports which is to expire on June 30, this year. A bill to renew this regulation is most likely to be submitted to the current Diet session.

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Gear Makers Plan Spring Meeting

THIS year's annual meeting of the American Gear Manufacturers Association will be held at the Hotel Cavalier, Virginia Beach, Va., May 22-24.

In addition to other features, a comprehensive program of papers and technical committee reports is being arranged. Papers will include: Gear Metallurgy, by E. J. Wellauer, Falk Corp., Milwaukee; Bronze for Worm Gears, by C. H. Bierbaum, Lumen Bearing Co., Buffalo; Surface Hardening of Gear Teeth, by Dwight Van DeVate, Gleason Works, Rochester, N. Y.; Turret Lathes in a Gear Shop, by R. J. Longstreet, Warner & Swasey Co., Cleveland. Also: Automotive Transmissions, by G. L. Rothrock, General Motors Corp.; Oil Well Pumping Units—Their Application and Use in the Field, by R. Griffin De la Mater, Parkersburg Rig & Reel Co.; Modern Drafting Room Practice, by George R. Martins, Falk Corp.; and The Importance of Safety, by E. S. Sawtelle, Tool Steel Gear & Pinion Co., Cincinnati.

J. C. McQuiston, 602 Shields Building, Wilkinsburg, Pa., is manager-secretary of the association.

Here Is Program for A. I. S. E. Conference

BIRMINGHAM—The official program of technical sessions for the annual spring conference of the Association of Iron and Steel Engineers to be held here March 27 and 28 at the Hotel Tutwiler, and under the direction of Fred M. Sturgess of the Tennessee Coal, Iron & Railroad Co., is as follows:

Monday, March 27

9.00 a. m.—Technical sessions.
"Relay Protective Methods for Steel Mill Service," by H. A. Travers, Power System engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh.

"Modern Wire Drawing Practice," by J. J. Phifer, superintendent, Fairfield wire works, Tennessee Coal, Iron & Railroad Co., Birmingham.

"General Types of Lubricants Essential to the Steel Plant," by William Mandy, Texas Co., Birmingham.

1.45 p. m.—Inspection trip, American Cast Iron Pipe Co., Birmingham.

6.00 p. m.—Dinner. Speaker, Robert Gregg, president, Tennessee Coal, Iron & Railroad Co.

8.00 p. m.—Technical session.
"Modern Plt Design and Practice at Fairfield Works," by E. A. Hawk, fuel engineer, and M. P. Burns, assistant fuel engineer, Tennessee Coal, Iron & Railroad Co.

"Unique Features in Southern Blast Furnace Practice," by George Ramsey, research department, Tennessee Coal, Iron & Railroad Co.

Tuesday, March 28

8.30 a. m.—Inspection trip, Tennessee Coal, Iron & Railroad Co. properties.

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Iron Ore Outlook Brightens; Movement May Double That of 1938

CLEVELAND—The outlook for the iron ore business appears considerably brighter than at this time last year.

Crispin Oglebay, president, Oglebay, Norton & Co., Cleveland, recently predicted the 1939 movement of ore would be 100 per cent larger than last

year when 19,263,011 tons were brought down from the Michigan, Wisconsin and Minnesota ranges. Mr. Oglebay based his prediction on a spring upturn in the steel business.

Operations on the ranges have held up well all winter. Only a few days ago the Cambria mine of Republic

Steel Corp. went on a four-day per week basis. Numerous other mines stepped up their production in December and January.

The annual tabulation of mine shipments, issued by the Lake Superior Iron Ore Association, shows the movement from the various ranges as follows:

Range	To Upper Lake Ports	All-Rail	Total
Mesaba	13,066,271	237,765	13,304,936
Marquette	1,433,001	43,256	1,476,257
Gogebic	2,274,599	3,107	2,277,706
Menominee	978,344	1,791	980,135
Vermilion	929,952	.....	929,952
Cuyuna	581,719	104	581,823
Grand Total.	19,263,886	286,023*	19,549,909

*Includes 49 tons lost in transit.

Total shipments from leading mines in the Mesaba Range included the following:

	Gross Tons
Mahoning	1,515,572
Hull Rust	1,294,509
Minnewas	995,590
Missabe Mountain	898,118
Adams Spruce Group	848,648
Sellers	687,636

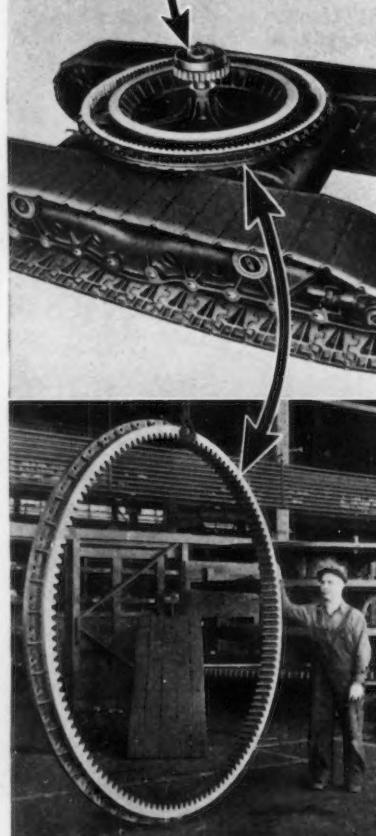
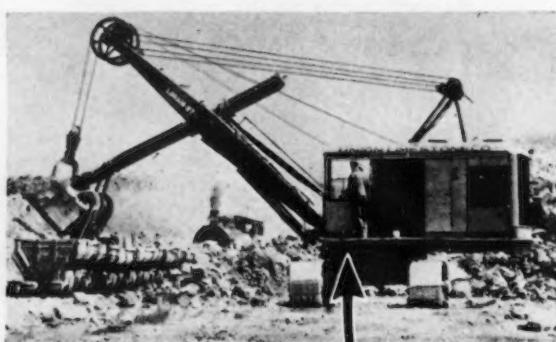
In the Marquette Range, Negaunee mine shipped 331,176 tons, followed by Morris with 239,867 tons. In the Gogebic, Montreal shipped 596,166 tons, followed by Eureka-Asteroid with 317,667. In the Cuyuna range, Armour No. 1 led with 199,242 tons, while on the Vermilion range, Pioneer mine was the largest producer with 422,912 tons during 1938.

Statistics on beneficiated ore for the year 1938 are as follows:

Method of Beneficiation	Michigan and Minnesota	Wisconsin	Total
Washed	2,235,037	.....	2,235,037
Jigged	460,559	.....	460,559
Magnetic	6,361	.....	6,361
Hi-Density	7,500	.....	7,500
Sintered	68,349	.....	68,349
Dried	48,639	.....	48,639
Total concentrates	2,826,445	.....	2,826,445
Crushed and/or screened	4,384,071	1,925,226	6,309,297
Total beneficiated	7,210,516	1,925,226	9,135,742

Midwest Power Conference At Chicago April 5-7

CHICAGO—The annual Midwest Power Conference will be held April 5 to 7 at the Palmer House, Chicago, under sponsorship of Armour Institute of Technology, Chicago, in cooperation with seven middle western colleges and universities. This year's meeting is the second under auspices of the institute. The program will include some 25 important subjects, emphasizing steam, diesel, electric and hydraulic power, to be discussed by authorities from educational and industrial fields. Of special interest will be a paper on the social significance of the development of diesel power, and discussions of high pressure-high temperature metallurgy.



The Farrel Internal Gear used for the swing mechanism of the Thew Lorain shovel as shown above has 132 generated spur teeth, 1½ DP, 4¾" face, 90.250" inside diameter, and meshes with 10-tooth pinion at 42.000" centers.

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The Gear with a Backbone



Managerial Rule by Dictation Gone, Chicago Convention Is Told

CHICAGO—One of management's great problems, industrial relations, was discussed last week before 1500 industrial relations men and authorities from nearly every industry in the country at the three-day conference in Chicago of the personnel division of the American Management Association.

Addresses were heard on nearly every phase of this important subject, from top management's responsibilities, down through job rating, and group medicine, to European systems of collectivism.

Chairman of the conference, C. R. Dooley, manager of industrial relations, Socony-Vacuum Oil Co., keynoted the meeting by emphasizing the dignity of the worker as a human being and his role as a partner with industry. Managerial rule by dictation has disappeared, Mr. Dooley said.

The Four Cornerstones

The four cornerstones of an industrial relations program, he said, are "Sincerity on the part of management in really wanting a good program, the basic philosophy that good industrial relations is the essence of good management, publication of the policy and education that the entire personnel may have understanding, and the position and status of the administrator and his staff."

Industrial relations is the No. 1 job of American industry in its effort to make business better, according to C. M. Chester, chairman, General Foods Corp., who spoke on "Top Management's Responsibilities." What is needed is to help employees improve themselves economically and technically, he said, pointing out that "consultative supervision" consisting of free and intellectually honest exchange of views on matters of mutual interest between management and workers is necessary.

It is possible, he thinks, to obtain a 25 per cent increase in efficiency throughout all American businesses, and the starting point in this ambition is the development of good personnel work. He even foresees the time when investors may place their funds with companies which are sincere in their industrial relations because of the sure knowledge that such will breed a more efficient, more productive and more profitable organization.

The wages and hours act, in a questions and answers session, was

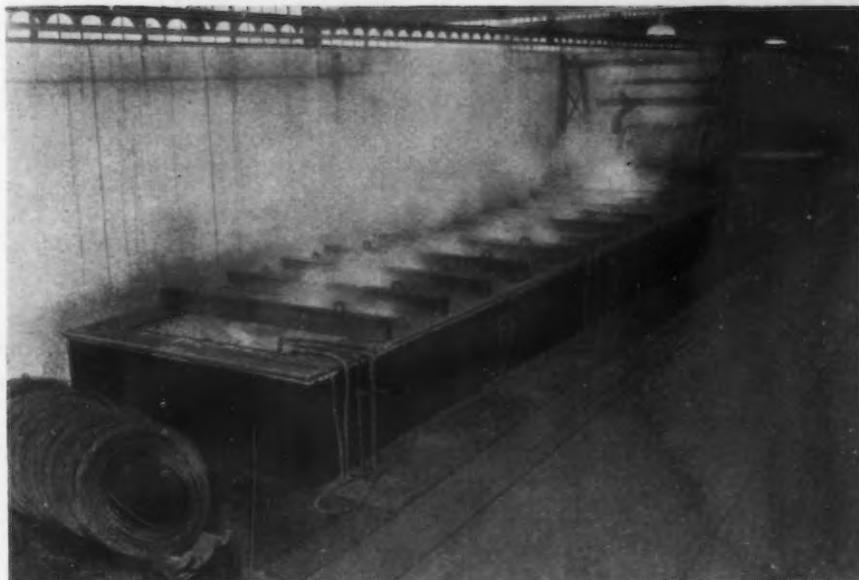
discussed by Orion J. Libert, acting midwest area director, wages and hours division, Department of Labor.

Henry Clifton, Jr., McLanahan, Merritt & Ingram, New York, pointed out that 27 states have minimum wage laws, and 45 states regulate maximum hours of employment. There appears

to be little question of the constitutionality of these acts, he said, pointing out that about the only possible avenue of attack on such legislation is in those aspects whereby the hours and wages of male adult employees are regulated.

With regard to the Walsh-Healey Act, Mr. Clifton said the most troublesome problem which has arisen thus far under the act is that relating to deductions from the minimum which apparently are forbidden by a strict

BASOLIT PICKLING TANKS



The above picture shows a three-section BASOLIT wire pickling tank 70' long, 10' wide and 7' deep, installed August 1935 at the Sheffield Steel Corporation, Kansas City, Mo.

Constructed with an inner lining of acid proof brick jointed with BASO-LIT, and outer lining of reinforced concrete—also available in combination with rubber lined steel outer shell.

The installation illustrated is one of many hundreds where BASOLIT has contributed toward long life and efficient operation of modern pickling equipment.

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PITTSBURGH, PA.

interpretation of Section 1 (b) of the act. He urged that the act be amended to allow deductions, where they are made for the sole benefit and with the voluntary consent of the employees involved.

The chairman of the advisory council on social security, J. Douglas Brown, of Princeton University, said the Social Security Act should be considered merely as basic protection against unemployment and the hazards of old age, and is calculated to encourage the use of private company benefit plans.

To those attending this meeting, one of the most interesting of all subjects was job evaluation and merit rating. Under the title, "Selling Job Rating to Supervisory and Working Force," W. R. Coley, factory manager, Leeds & Northrup Co., Philadelphia, discussed the first of these. In order to have a wage system that is fair to all concerned, it must be based on an objective appraisal of the value of each job. To develop such a program, Mr. Coley declared, the management must have the hearty cooperation of workers and supervisors. Unless a company has some such guiding plan, wages for one kind of work may get out of line with that paid for another type.

Boston Gear Works Plan

In rating merit, according to the plan used by the Boston Gear Works, North Quincy, Mass., which was described by its president, H. H. Kerr, quality of work, quantity of work, versatility, degree of supervision required, ingenuity, attitude and attendance, are the principle classifications used in the system.

Each of these classifications is weighted according to the importance placed upon them by the company, and a certain number of points is awarded for proficiency and varying degrees of proficiency in each. Each man in the plant is rated in this manner by his foreman, assistant foreman and the supervisor of his department, all acting independently of one another. From the total points awarded each man, a proportional addition is made to his base pay rate.

Thus the company always has a reason for giving raises to one man and not another, it knows who is progressing and who is not, and when a man has a grievance because of his pay the company has his rating as an explanation. Men like the plan, according to Mr. Kerr, because they know their chances are as good as the next fellow's, personalities are eliminated, weak points are shown up and can be worked on, and the possibility of unwarranted advancement is eliminated.

C. Canby Balderston, professor of industry, University of Pennsylvania, discussed in his address on "Regularization of Employment," such methods as the smoothing out of the seasonal curve by seasonal discounts, market research, advertising and sales promotion, new designs and diversification, and annual wage plans, which guarantee income even if not employment.

"Standards of Executive Performance" was the title of a talk by William Conover, assistant director of industrial relations, United States Steel Corp. of Delaware, Pittsburgh. Mr. Conover showed how top management is really responsible for a company's production because of its attitude. Good foreman supervision is always directly traceable to good top supervision. Close personal supervision is desirable, as a very powerful influence, Mr. Conover said, is the belief of a man in his boss. Teamwork and fair play between the top and the foreman and employees is necessary, with no discrimination.

Salary Recognition

Management, according to Mr. Conover, should reduce its objectives to writing, and then see where the present organization fits in the scheme. Each executive should have a definite responsibility in the fulfillment of these objectives, and performance standards should be established. Regular staff meetings to determine progress made and whether each member of the executive staff is doing his part should be held. A final important point, Mr. Conover said, is appropriate salary recognition, with the reason for increases known by both parties.

At the final session of the conference, Charles R. Hook, president, American Rolling Mill Co., and chairman, National Association of Manufacturers, told in a closed meeting of some of the personnel and industrial relations techniques used in his organization, and outlined some objectives of an industrial and public relations program.

Illinois Industry Fights Tax on Gross Receipts

CHICAGO—A proposed 2 per cent tax on gross receipts of Illinois manufacturers for goods sold in the State is being opposed rigorously by the Illinois Manufacturers' Association. Since the tax would be passed on in the selling price of goods, according to the association, it believes that Illinois consumers would be encouraged to buy in other states, and urges opposition to the bill.

Hot-Dip Galvanizers Elect New Officers

I. M. HERMANN, president of Acme Galvanizing Co., Milwaukee, was elected president of the American Hot-Dip Galvanizers Association at the annual meeting of this trade association, held at the Hotel Roosevelt, New York, on Feb. 14 and 15. A. J. Blaeser, of Joslyn Mfg. & Supply Co., Chicago, was named first vice-president, and F. P. Auxer, of National Telephone Supply Co., Cleveland, second vice-president. Stuart J. Swensson continues as secretary and treasurer. The various standing committees were maintained, including the one handling the group advertising campaign and the technical advisory committee.

Several papers on the technical aspects of hot-dip galvanizing were presented at the meeting under the following titles: Hot-Dip Galvanizing by the Centrifugal Process, by Phelps Ingersoll, the Wilcox-Crittenden Co.; Embrittlement of Malleable Iron, by F. M. Carlson, American Tinning & Galvanizing Co.; Proper Fire Insurance Coverage for the Galvanizing Industry, by Mr. Hermann; and Basic Principles of Combustion Engineering as Applied to Hot-Dip Galvanizing Furnaces, by W. G. Imhoff, technical director of the association.

Moulton to Address ASTE Dinner March 13

HAROLD G. MOULTON, president, the Brookings Institution, Washington, is to be the featured speaker at the preview dinner preceding the opening of the Machine and Tool Progress Exhibition in Detroit on March 13.

The dinner, sponsored by a group of leading industrialists, including K. T. Keller, president, Chrysler Corp., W. S. Knudsen, president, General Motors Corp., and Alvan Macauley, president, Packard Motor Car Co. in cooperation with the American Society of Tool Engineers, has as its topic "The Effect of the Development of the Machine on Employment and Standard of Living."

The fact finding committee of the ASTE which under the direction of Professor John M. Younger, Ohio State University, has been studying the relation of the machine to employment and standard of living, will present its preliminary report at this dinner.

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THE NEWS IN BRIEF

Cleveland chapter of American Society of Tool Engineers will hear address by J. C. Cotner, Logansport Machine Co. chief engineer, on March 24.—Page 49.

Number of steel workers in 1938 only 3 per cent under 1929, although ingot output was nearly 50 per cent lower.—Page 49.

Automobile Show moved ahead three weeks to Oct. 15, and Truck Show abandoned. Seasonal slackening reduces auto output to 79,860. Packard official cites depleted stocks as good omen of spring activity. Studebaker celebrates 87 years without major labor trouble.—Page 50.

Mansfield, Ohio, works ships more electric refrigerators last month than in any other January in its history.—Page 53.

ICC suspends Chesapeake & Ohio tariff schedules increasing rate on coke from West Virginia points to Jeffersonville, Ind.—Page 56.

Question of steel wage deductions for insurance, medical expenses, charity contributions is placed before Public Contracts Board.—Page 56.

Bureau of Standards publishes a research paper on "The Elastic Properties of Cast Iron."—Page 57.

Federal contracts for iron and steel products during latest reported week total \$306,482; machinery awards, \$826,781.—Page 57.

Administration measure aims at reduction in volume of federal questionnaires sent to business men.—Page 58.

Japan may extend law for duty-free pig iron.—Page 60.

Responsibility for stream pollution rests with industry and municipal authorities, President Roosevelt says.—Page 60.

American Gear Manufacturers Association will hold its annual meeting May 22-24 at Virginia Beach, Va.—Page 61.

Association of Iron and Steel Engineers announces program of technical sessions for annual spring conference March 27-28 at Birmingham.—Page 61.

Lake Superior iron ore outlook for 1939 fairly bright; predicted that shipments may be double those of 1938.—Page 62.

Annual Midwest Power Conference will be held April 5-7 at Chicago under sponsorship of Armour Institute of Technology.—Page 62.

Managerial rule by dictation has disappeared, Sacony-Vacuum executive tells convention of American Management Association at Chicago.—Page 63.

Illinois manufacturers oppose suggested 2 per cent tax on gross receipts for goods sold in that state.—Page 64.

Harold G. Moulton will speak March 13 at the dinner preceding the opening of the Machine and Tool Progress Exhibition, sponsored by the American Society of Tool Engineers.—Page 65.

I. M. Hermann, president of Acme Galvanizing Co., is elected president of the American Hot-Dip Galvanizers Association at its annual meeting Feb. 14-15.—Page 65.

British have large stocks of scrap; imports off sharply.—Page 68.

Advanced course in arc welding design and practice will be offered March 6-10 by the American Society of Metals at Rock Island, Ill.—Page 68.

J. N. Moylan, of American Steel & Wire Co., is appointed chairman of credit association's steel committee for 2-bond law program.—Page 69.

Number of small steel plants which do not manufacture steel ingots has tripled in the last 50 years, according to a report of the American Iron and Steel Institute.—Page 69.

Preliminary plans for the 1939 machine tool electrification forum sponsored by Westinghouse Electric & Mfg. Co., are announced.—Page 69.

Wage-Hour Administrator Andrews interprets Fair Labor Standards Act where collective bargaining agreement exists.—Page 71.

Labor Board orders Dahlstrom Metallic Door Co. to bargain with CIO affiliate.—Page 71.

Navy Department's supplies bureau awards contracts for grinding, welding machines, other machinery.—Page 71.

Average yearly earnings of Blaw-Knox Co. employees declined only 6 per cent in 1938, William P. Witherow, president, reports.—Page 71.

Damage suits against steel, machinery and other industries which quote identical bids are likely if U. S. wins in litigation with 18 tire makers.—Page 74B.

Contracts for private construction projects awarded in 37 eastern states during January topped the like month of 1938 by 39 per cent.—Page 74B.

Lukens Steel Co. officials are re-elected by stockholders.—Page 82.

Republic Steel Corp. publishes report to be issued regularly to its employees.—Page 82.

Steel companies plan to spend during 1939 a total of \$126,000,000 for new construction and equipment.—Page 92.

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MEETINGS

March 14 to 18—American Society of Tool Engineers, Detroit.
April 10—Industrial Marketers of Cleveland, Cleveland.
April 26 to 29—Electrochemical Society, Columbus, Ohio.
May 15 to 18—American Foundrymen's Association, Cincinnati.
May 16 to 17—American Steel Warehouse Association, Chicago.
May 24 and 25—National Metal Trades Association, Chicago.
May 25—American Iron and Steel Institute, New York.
May 25 to June 1—Triple Convention (American Supply and Machinery Association, the National Supply and Machinery Distributors' Association and the Southern Supply and Machinery Distributors' Association), on board the S.S. Monarch of Bermuda.
Oct. 23 to 27—National Metal Congress, Chicago.

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British Have Large Stocks of Scrap; Imports Off Sharply

BRITISH imports of iron and steel scrap have fallen to insignificant proportions recently. The weekly average during the current year has been no more than 145 tons, compared with 20,000 tons weekly in 1936 and 18,000 tons in 1937. There

have been no recent shipments from America.

At the same time that Britain is taking less scrap it is understood that she is now taking more ships from abroad for scrapping in British yards.

British scrap merchants have been for many months nursing uncomfortably heavy stocks—an inevitable sequel to the large orders placed at comparatively high prices in the United States in 1937. At that time the total tonnage of scrap which steel-

makers had on order was inadequate in relation to their heavy steel contracts. Only when the 1937 boom was pricked did scrap supplies become unwieldy.

In view of the continued slackness of demand the sharp fall in scrap prices which took place recently is not surprising. By the revision enforced at the beginning of January the quotation for No. 1 steel melting scrap delivered South Wales was reduced by 8s. 6d. (\$2.04). For the eastern area the revised price was 60s. 3d. (\$15) and for the western area 62s. 9d. (15.60), the difference being explained by transport costs. These reductions are equivalent to about 12 per cent and have led to considerable criticism by scrap merchants. As steel prices were reduced by no more than 6 to 8 per cent, it is contended that the scrap merchants are bearing more than their share of the hardship resulting from heavy stocks. However, the steelmakers reply that, inasmuch as scrap constitutes only about one-half of the cost of materials used in steel production, the 12 per cent reduction in scrap prices results in a saving of only 6 per cent to the steel industry.

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THE CINCINNATI BICKFORD TOOL CO.
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Welding Course to be Held in Tri-Cities Area

AN advanced course in arc welding, design and practice, sponsored by the American Society for Metals and the Lincoln Electric Co., Cleveland, will be available March 6-10 to production managers, designers, and welding supervisors, foremen and operators in Moline and Rock Island, Ill., and Davenport, Iowa, and environs. Meetings will be held at the Rock Island Arsenal under the direction of E. W. P. Smith, consulting engineer, Cleveland.

The primary object of the course is to provide opportunity for studying the redesign of products for arc welded construction. The talk will also include free consultation, by appointment each day except Monday, March 6, at the Moline office of the Lincoln Electric Co., 1205 Fourth Street, Moline. The fee for the course is \$5.00.

Hoopes, Cunningham & McKinney, industrial design consultants, have recently enlarged their staff and removed their offices to 12 South 12th Street, Philadelphia. The services of this group include the design of industrial and technical products from the standpoint of both function and appearance.

Small Steel Plants Tripled in 50 Years

THE number of small, non-integrated steel plants which do not manufacture steel ingots has increased threefold over the past 50 years, according to a recent study made by the American Iron and Steel Institute. Over the same period, the number of integrated plants producing steel ingots as well as finished products has declined 40 per cent.

Total capacity of the steel industry for producing finished products today is 600 per cent higher than in 1889, however, reflecting not only the increase in the number of non-integrated producers but also the much greater capacity of present-day integrated companies as compared with those of 1889.

Out of the present total of 361 plants for producing finished steel products, 139 or almost 40 per cent are plants of non-integrated companies producing principally cold-finished steel bars, cold-rolled strip steel, sheets, tin plate, butt-weld pipe, seamless tubes and wire products. Non-integrated producers represent substantially 50 per cent of the steel industry's total capacity for producing cold-rolled strip and cold-finished bars, and are important producers of other classes of products.

Fifty years ago, 46 non-integrated plants in the industry represented only 11 per cent of the total 417 finishing mills then in existence. Their principal products were iron bars and iron wire re-rolled from old material.

Electro-Metallurgical Plant Contract Awarded

FISKE-CARTER CONSTRUCTION Co., Greenville, S. C., has been awarded the contract to build the first unit of the new Muscle Shoals, Ala., plant of the Electro-Metallurgical Corp.

Steel & Wire Man Heads 2-Bond Law Committee

J. N. MOYLAN, American Steel & Wire Co., Chicago, has been made chairman of the steering committee for the iron and steel industry to assist in the conduct of the Two-Bond Law program now being carried on by the legislative department of the National Association of Credit Men.

The Two-Bond Law program is designed to secure more adequate and uniform protection for all companies supplying materials directly or indirectly on state public works projects. It is estimated that the construction industry has lost more than \$1,500,000 annually on New York state projects alone, while losses exceeding \$500,000 annually for the last five years have been sustained by material suppliers on construction of public works for the City of New York.

Fourth Westinghouse Machine Electrification Forum Planned

PRELIMINARY plans have been announced for the 1939 machine tool electrification forum, sponsored by Westinghouse Electric & Mfg. Co., to be held at East Pittsburgh, April 18-20. This will be the fourth of these annual meetings, which were originated in 1936 as an open forum for discussion of machine tool electrification problems and practices.

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● Parts made from STRESSPROOF No. 2 are ready for service following the last machining operation because as received by you, STRESSPROOF No. 2 has a minimum yield point of 100,000 lbs. per sq. in.; unique wearability and freedom from warpage.

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TRADE NOTES

Roots-Connersville Blower Corp., Connorsville, Ind., through J. B. Trotman, manager of the turbine pump division, has appointed these sales representatives: R. L. Deppmann Co., 957 Holden Avenue, Detroit, in the eastern half of Michigan, and in the Toledo area of Ohio. B. J. Walter, who was formerly in charge of the territory mentioned, is now connected with the Deppmann organization. A. G. Bradbury, 2842 West Grand Boulevard, Detroit, continues in charge of sales of other Roots-Connersville products. Messrs. Lee and Clark, 29 North Jefferson Street, Chicago, have succeeded F. S. Salchenberger as turbine pump representatives in the greater Chicago area.

Roots-Connersville maintains a branch office at 140 S. Dearborn Street, Chicago, handling all products except turbine pumps, including blowers, meters, gas and vacuum pumps, etc. Hiram H. Haight, 2310 West Vliet Street, Milwaukee, has been given the state of Wisconsin on Roots-Connersville Water Systems in addition to handling the complete turbine pump line in the metropolitan Milwaukee section. Ryan Sales Corp., 3520 West End Avenue, Nashville, covers all of the central counties of Tennessee, this section having previously been handled direct from the factory office at Connorsville.

National Enameling & Stamping Co., founded in Milwaukee in 1879 as the Kieckhefer Mfg. Co., tin and enameled ware, and

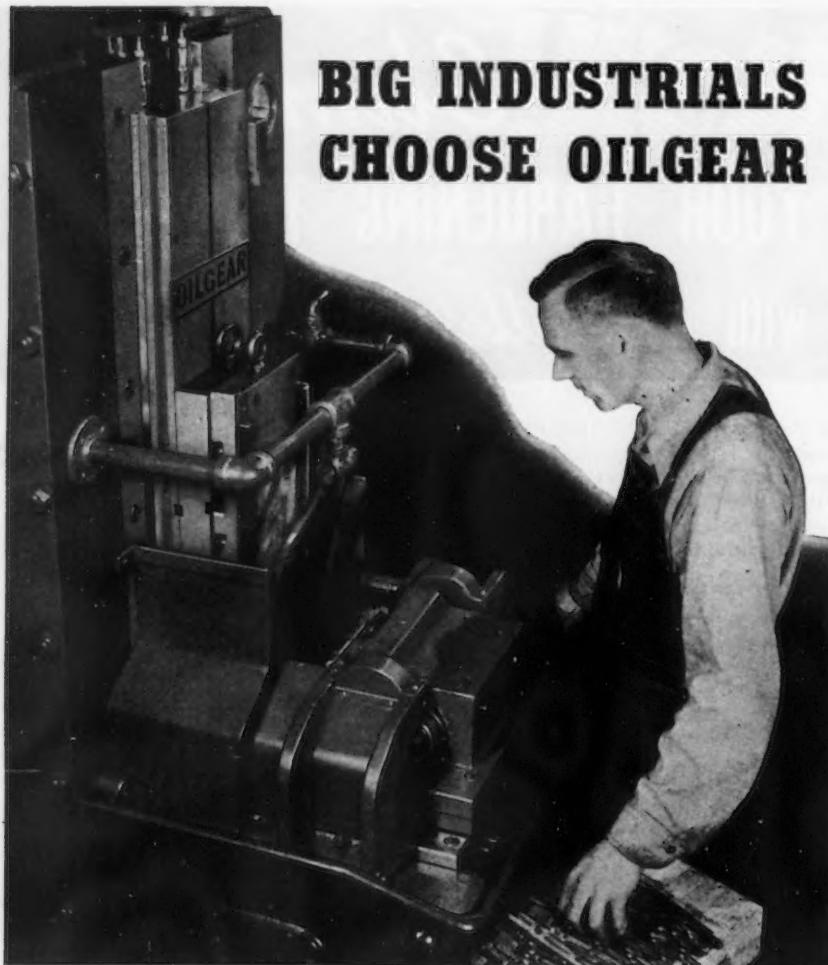
which started to transfer some of its operations to other factories last fall, will close its tinware department at Milwaukee on March 15 as the last move in this program. The kitchenware division will be moved to branch plants in Granite City, Ill., and Baltimore.

Conversion of the bulk freighter H. T. Ewig into a self loader and unloader at an estimated cost of \$150,000, has been announced by Crispin Oglebay, president of Oglebay, Norton & Co., and president of the Columbia Transportation Co.

York Ice Machinery Corp., York, Pa., announces that its sales for the first four months of the fiscal year, from October, 1938, to January, 1939, inclusive, were 11 per cent ahead of the corresponding period last year.

Industrial Sales & Engineering Co., 3118 North Broad Street, Philadelphia, has been appointed Philadelphia district sales representative for the territory comprising southeastern Pennsylvania, New Jersey, and eastern Maryland by the American Flexible Coupling Co., Erie, Pa.

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FINANCIAL NOTES

Westinghouse Electric & Mfg. Co. reported for 1938 net profits of \$9,052,773 after depreciation and taxes, compared with net profit for 1937 of \$20,126,408. Sales billed through 1938 were 23 per cent below 1937 while 1938 bookings totaled \$149,662,776 compared with \$229,540,061 for 1937.

Globe Steel Tubes Co., Milwaukee, in 1938 showed a net loss of \$20,445 as compared with net profit in 1937 of \$281,323. The company's report stated that gross sales declined 40 per cent in 1938.

Baldwin Locomotive Works and subsidiaries, including the Midvale Co., had a consolidated net loss of \$1,032,641 in 1938, compared with consolidated net income of \$407,377 in 1937, Charles E. Brinley, president, reports. Baldwin's share in the earnings of Midvale amounted to \$765,353 last year, and \$825,513 in 1937. During 1938, consolidated sales amounted to \$33,107,564, including sales of locomotive products totaling \$16,767,781. In 1937, consolidated sales were \$36,586,461, of which \$17,977,001 represented locomotive products. Unfilled orders, without intercompany eliminations, were \$13,401,321 at the close of last year, of which \$1,278,018 was for new locomotives. As of Jan. 1, 1938, total unfilled orders, adjusted by elimination of certain orders the performance of which has been indefinitely suspended, were \$23,757,714. Of this amount, \$12,712,783 was for new locomotives.

Link-Belt Co., Chicago, for 1938 reports net profit of \$1,106,041 as against 1937 profits of \$3,232,373. Net sales totaled \$18,518,083 for 1938, a decrease of 30.51 per cent from the \$26,643,840 reported for 1937, the largest sales total ever reported by the company.

Scullin Steel Co., St. Louis, reports net sales for 1938 of \$1,760,384 compared with \$5,616,805 in 1937. Net earnings, before interest on mortgage bonds but after depreciation, were \$129,803, compared with \$1,093,198, before bond charges in 1937. The mill property rental from Sheffield Steel Co. amounted to \$67,399, while the depreciation thereon was \$83,536, a net loss of \$16,137. Total current assets were \$2,031,245 and current liabilities \$183,745.

Van Norman Machine Tool Co. last year showed a net profit of \$303,297, equal to \$3.41 a share on the company's 88,829 common shares, contrasted with a net profit of \$345,019 or \$3.88 a share in 1937.

Andrews Interprets Wage-Hour Provision

WASHINGTON.—Wage-hour Administrator Elmer F. Andrews has interpreted Sec. 7 (b) (2) of the Fair Labor Standards Act, under which employees may be worked up to 12 hr. a day and 56 hr. a week without being paid overtime rates if the overtime is allowed in a bona fide labor agreement, and if the worker is employed on an annual basis, to mean that the worker must be guaranteed a fixed annual wage or continuous employment for a year and must not be employed more than 2000 hours within a 12-month period.

A bona fide collective bargaining agreement can also be used as a basis for exemption from the overtime pay requirement of the law under Section 7 (b) (1) but under that provision employees cannot be worked for more than 1000 hours during a period of 26 consecutive weeks.

The law provides that the NLRB shall certify whether a particular bargaining agreement is bona fide but the Labor Board has thus far been unable to make any certification because of Congressional failure to make provision for this added burden.

Blaw-Knox Pay Envelopes Only 6% Lighter in 1938

PITTSBURGH.—In an explanatory earnings report to employees, which represents a new practice, William P. Witherow, president, Blaw-Knox Co., points out that while wage rates were maintained in 1938, the company's total payroll decreased 22 per cent and average employees' yearly earnings dropped only six per cent despite appreciably greater reduction in gross sales and net profit.

Blaw-Knox Co. and subsidiaries report a net profit of \$145,601 for 1938 equal to 11c. a share, compared with net profit of \$2,379,692 or \$1.78 a share in 1937.

Navy Supplies Bureau Awards Contracts

WASHINGTON.—The Navy Department's Bureau of Supplies and Accounts last week announced award of the following contracts:

Pratt & Whitney division of Niles-Bement-Pond Co., grinding machine, \$6,186; H. B. Underwood Corp., bar boring and equipment, \$5,931; Aluminum Company of America, pipe, tub-

ing, rivets and shapes, aluminum alloy, \$16,812; General Electric Co., arc welding machines, \$34,300; Chapman Valve Mfg. Co., valves, gate, composition, \$9,433; American Car & Foundry Co., plug cocks, \$7,026; Charles Mundt & Sons, nickel-copper alloy, sheets, perforated, \$11,454; United Aircraft Corp. (Hamilton Std. Propellers Div.), aircraft propellers, \$16,311.

NLRB Rules for CIO Against Door Company

WASHINGTON.—The National Labor Relations Board has directed the Dahlstrom Metallic Door Co., Jamestown, N. Y., to cease interference with, and, upon request, to bargain with the United Electrical, Machine and Radio Workers of America, Local No. 307, (CIO).

Forgings AT LOWER COST...

FORGING COSTS go down in Erie Hammer-equipped shops because Eries are built with the weight and power necessary for high speed production of uniformly accurate forged parts... takes more than a "good" hammer to turn out continuously first quality forgings to uniformly close limits... to minimize expensive finishing... Erie's 36 years of experience enables you to choose steam and board drop hammers that fit your forging requirement... Bulletins 325 and 328 give full details. Write for your copies.

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GERMANY
John Holtz & Sons Co. Ltd.

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315 Penn Street

ENGLAND
Bentley & Sons Co. Ltd.

ERIE BUILDS Dependable HAMMERS

... PERS



H. S. BEAL



C. H. SAITER

FRED GROTT, heretofore vice-president and works manager of the Chicago Steel Foundry Co., Chicago, has been elected president and a director of the Fort Pitt Steel Casting Co., McKeesport, Pa., succeeding the late C. S. Koch. Mr. Grotts received his formal education at the University of Illinois and School of Mines and Metallurgy of the University of Missouri. Shortly after graduation he became chief metallurgist and chemical engineer of the Curtis Aeroplane & Motor Corp., Buffalo, where he had technical control over metallurgical processes during the World War. He is a member of a number of technical societies, including the American Society for Testing Materials, American Institute of Mining and Metallurgical Engineers and American Foundrymen's Association.

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HENRY S. BEAL, who has been president of the Sullivan Machinery Corp., Chicago, has been made general manager of the Heald Machine Co., Worcester, Mass. He was formerly manager of the Jones & Lamson Machine Co. and served the National Machine Tool Builders' Association as president in 1932-33.

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C. H. SAITER has been appointed sales manager of the heavy crane division, Cleveland Crane & Engineering Co., with headquarters at Wickliffe, Ohio. He was connected with the Morgan Engineering Co. for 10 years before going to the Cleveland Crane

& Engineering Co. in 1922. H. T. FLORENCE, who has been sales manager, was recently appointed general manager of the company.

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JOHN W. LOHNE, for the past three years attached to the Chicago office of the Vanadium Corp. of America, New York, has been appointed assistant to the general manager of sales. Prior to his association with Vanadium, he was with the Carnegie-Illinois Steel Corp.

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ALBERT E. HACKETT, formerly with the Thomson-Gibb Co., has joined Progressive Welder Co., Detroit, in an executive capacity, according to an announcement by Fred Johnson, president. Mr. Hackett is widely known in the welding field. His experience with resistance and other types of welding designs and installations have extended over a period of nearly 30 years.

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GEORGE A. BRANDL, for the past 15 years identified with roofing and sheet metal building products in sales and executive capacities, has been appointed manager of jobber sales for Berger Mfg. Division, Republic Steel Corp., Canton, Ohio.

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T. M. EVANS, formerly associated with the Gulf Oil Corp., has been made president of the H. K. Porter Co. Directors include H. C. BUGHMAN, JR., president, Union Spring &

Mfg. Co.; Q. S. SNYDER, vice-president, Blaw-Knox Co.; CHRISTIAN Z. SCHOVE, attorney; H. R. DONNALLY, president, Iron & Glass Dollar Savings Bank and Mr. Evans. The 73-year-old industrial locomotive plant has been taken over by its bondholders under a reorganization plan which provides that the company emerge from the reorganization debt-free and with a net working capital of more than \$250,000. The plan has been confirmed by the Federal Court.

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J. T. WHITING, formerly vice-president of the Alan Wood Steel Co., Conshohocken, Pa., has been elected president, succeeding CLEMENT B. WOOD, who has resigned as president but continues as chairman of the board. C. E. DAVIS, who has been assistant to the vice-president, has been elected vice-president.

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PROF. JAMES J. RYAN, department of mechanical engineering, University of Minnesota, Minneapolis, gave an illustrated lecture on the determination of stresses in structural steel by means of polarization of light be-



T. M. EVANS

PERSONALS . .

fore the February meeting of the Engineers' Society of Milwaukee.

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T. M. GIRDLER, chairman of the Republic Steel Corp., visited the Birmingham and Gadsden properties of his company last week. Mr. Girdler was quoted as stating that further improvements would be made from time to time.

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GEORGE A. PAGE, chief engineer, Curtiss-Wright Corp., St. Louis Airplane Division, will address the Detroit section of the Society of Automotive Engineers on Feb. 27 on the development of large transport type airplanes. He has been connected with Curtiss-Wright for more than 21 years and has been active in aviation since 1910.

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FRANCIS JURASCHEK has been appointed manager, market research, Carnegie-Illinois Steel Corp., Pittsburgh. Prior to this appointment he was consulting editor for THE IRON AGE.

His past experience also included three years with McGraw-Hill Pub-



J. W. LOHNEs



A. E. HACKETT

lishing Co., and a considerable number of years in market research, general advertising, and sales promotion work. For seven years he was president of an industrial advertising agency known as Freystadt-Juraschek, Inc., New York, and for two years was managing director of Power Transmission Council.

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J. EDWIN DOYLE, head of the personnel division of the General Electric Co., Lynn, Mass., plant, has been made a director of the Unemployment Compensation Division of Massachusetts by Governor Saltonstall. Mr. Doyle is not severing his connection with the General Electric Co., having been loaned to the State for a six to nine months period during which he will reorganize the State Department. Born in North Billerica, Mass., Dec. 8, 1889, Mr. Doyle went to work for the General Electric Co. in 1916 as a transformer winder. Three years later he was editor of the employees' plant paper; in 1923 was made assistant to the personnel manager; and in 1917 was made supervisor of personnel. He received a law school degree in 1932.

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G. J. HAWKEY, president, Cleveland Duplex Machinery Co., Inc., has been elected chairman of the Cleveland chapter, American Society of Tool Engineers. R. H. BEHREND, assistant chief tool designer, National Acme Co., has been elected vice-chairman. C. V. Briner, Pratt & Whitney Co., has been elected secretary, and C. W.

Scheihing, chief inspector, at the Edgewater works of National Carbon Co., Inc., has been chosen treasurer.

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CHARLES L. JACOBSON has assumed the duties of vice-president and general manager of the Chrysler Division of the Chrysler Corp., it has been announced by David A. Wallace, president. Mr. Jacobson, who formerly was sales manager, now occupies the position which was held by JOSEPH W. FRAZER, recently resigned to become president and general manager of Willys-Overland Co. Mr. Jacobson has spent 25 years in the automobile industry, 14 of them with Chrysler.

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L. L. FERRALL, metallurgist with the Timken Roller Bearing Co., has resigned and joined Rotary Electric Steel Co., Detroit.

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ANTHONY J. GUTHRIE has been appointed director of industrial relations of the Chicago Pneumatic Tool Co. He has been secretary and assistant to the vice-president in charge of plant operations.

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H. H. FIELD, secretary, treasurer and a director of the Lindsay Wire Weaving Co., Cleveland, has relinquished his title as secretary to reduce his activities in management of the company with which he has been associated nearly 34 years. He was honored at a company dinner recently. HARRY H. SMITH has become secre-



G. A. BRANDEL

tary of the company. Mr. Field will continue as treasurer and member of the board of directors.

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HARVEY C. HAMILTON, Cleveland, formerly with the Lake Ports Shipping Co., is now commercial representative for Oglebay, Norton & Co. and the Saginaw Dock & Terminal Co., whose boats handle steel, pig iron, scrap metal and miscellaneous bulk commodities.

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GORDON FOX, of the Freyn Engineering Co., Chicago, sailed recently for Holland in connection with services being rendered by that company to the Royal Dutch Blast Furnace & Steel Works at Ymuiden. This company, which has three Freyn design blast furnaces, is adding open-hearth and rolling mill departments.

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DR. ALBERT RAY OLPIN has been appointed director of industrial research and field director of the engineering experiment station at Ohio State University.

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ROBERT C. STANLEY, president of the International Nickel Co., who has been nominated as a director of the United States Steel Corp. to succeed **WALTER S. GIFFORD**, has been associated with the nickel industry since 1901. Born



R. C. STANLEY



WILLIAM M. RECTOR, who was recently appointed New York district sales manager of the Weirton Steel Co. He was formerly district sales manager in Rochester, N. Y.

headquarters at 216 Indianapolis Terminal Warehouse.

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WILLIAM ABBETT LEWIS, Jr., engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, and a lecturer in electrical engineering at the University of Pittsburgh, has been appointed director of the School of Electrical Engineering in the College of Engineering, Cornell University. Mr. Lewis is a graduate of the California Institute of Technology. He entered the central station department of the Westinghouse company in East Pittsburgh in 1929.

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HOMER BRITTON has been elected vice-president and general foundry manager of the Cleveland Co-Operative Stove Co., Cleveland. He joined the company 26 years ago as general office clerk. For several years he has been foundry manager at the Company's No. 2 plant in Cleveland.

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Plant and laboratories of the Alrose Chemical Co. and Mark Weisberg Laboratories have recently been moved from their former Providence, R. I., locations, 80 Clifford Street and 92 Printery Street, to a new, enlarged factory at 180 Mill Street, Cranston, R. I. The new plant, off Park Avenue, has 40,000 sq. ft. of working space, with laboratories to accommodate eight chemists. The John P. Bonnett & Son Co., formerly owned by Mark Weisberg Laboratories, has been liquidated.

in Little Falls, N. J., he received his formal schooling at Stevens Institute of Technology and Columbia University School of Mines. He began his business career with the International Nickel Co. as a mining engineer and successively became general superintendent, first vice-president, and president of that company. Mr. Gifford indicated a desire not to stand for re-election because of the press of other duties.

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C. M. EASON has been elected president of the Industrial Clutch Co., Waukesha, Wis. **E. R. ESTBERG** has been made treasurer and **JOHN J. PFEFFER**, secretary.

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F. E. BLACKBURN, who has had a long experience in the production of alloy and stainless steels, has become associated with the sales department of the Ohio Ferro-Alloys Corp., Canton, Ohio, as sales engineer.

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EDWIN L. DENNIS, for 12 years chief engineer and consultant for Godchaux Sugars, Inc., has resigned to become chief combustion engineer for the Cupp Engineering Corp., Worcester, Mass.

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C. W. LUGAR has been added to the Indianapolis staff of the Wheelco Instruments Co., Chicago. He has been identified with the Minneapolis-Honeywell Co. He will make his



R. E. CHRISTIE, whose appointment as assistant to **R. E. Desvergne**, president of the Crucible Steel Co. of America, was announced in these columns last week.

... OBITUARY ...

CHARLES RICHARD CRANE, former president of the Crane Co., Chicago, philanthropist and diplomat, died last week in Palm Springs, Cal., aged 80 years. Son of the founder of the Crane Co., Mr. Crane was educated in Chicago public schools. After traveling extensively, he joined the Crane organization shortly before the turn of the century. From 1912 to 1914 he served as president of the company, retiring in the latter year. He served on Wilson's special diplomatic commission to Russia in 1917 and as America's commissioner on mandates in Turkey in 1919. In 1920, Wilson appointed him minister to China, where he served two years.

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VINCENT M. DIRKES, manager of Fisher Body Division of the General Motors Corp., St. Louis, died suddenly in St. Louis of a cerebral hemorrhage on Feb. 18. He was 44 years old and had been in charge of the St. Louis plant since 1934. Born in Perham, Mass., Mr. Dirkes obtained his early education there. When his family moved to Detroit he entered the Cadillac School of Applied Science and later was graduated from the University of Detroit with an engineering degree. While attending the university he worked nights for the Ford Motor Co. In 1914 Mr. Dirkes became an apprentice at the Cadillac Motor Car Co. The following year he entered the tool and die department of the Ford Motor Co. A year later he became a member of the engineering department of the City of Detroit. In 1922 he was employed in the construction department of Fisher Body. In 1927 he was transferred to the production department, was made assistant plant manager in St. Louis in 1933 and became resident manager in 1934.

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HARRISON J. L. FRANK, president of the Bull Dog Electric Products Co., Detroit, and director of the United Stove Co., Ypsilanti, Mich., died suddenly Feb. 14 at Miami, Fla., where he had been spending the winter. Mr. Frank was a graduate of Linsly Institute of Wheeling, of the University of West Virginia in 1900 and also of Harvard University in 1901. Born in Wheeling, W. Va., on Oct. 28, 1880, he went to Detroit in 1915. Mr. Frank served as president of the Detroit Electrical Club in 1917 and had been identified with the electrical industry since entering the organization of the Mutual Electric & Machine Co. of

Wheeling, which concern went to Detroit in 1915 and changed its name in 1927 to Bull Dog Electric Products Co.

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DOUGLAS McCACKEN, vice-president of the Walter Machine Screw Co., Detroit, died Feb. 13 following a six weeks' illness. Mr. McCracken was born 70 years ago in Angus, Ont., and had lived in Detroit 47 years.

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JOHN L. FLEMING, former Detroiter, died Feb. 15 at Brussels, Belgium. Born in Detroit 76 years ago and educated in Detroit schools, Mr. Fleming became associated with the Griffin Car Wheel Co. of Detroit and Buffalo as a young man. Later he was sent abroad to establish plants in several European countries. During the World War he served on the Belgium Relief Commission under ex-President Hoover. At the time of his death, he was European representative of the U. S. Steel Products Co.

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GEORGE GOEBEL, chief engineer of the Crown Cork & Seal Co., Baltimore, Md., died at the Union Memorial Hospital in that city on Feb. 4, aged 58 years. He came to this country from Germany to erect certain heavy machinery in Detroit for a German firm and decided to remain. He helped build the radiators for Ford cars when the first models came on the market. About 25 years ago he became identified with Crown Cork to design and construct assembling machines to put cork disks in crown shells and while with the company developed many new ways of doing things mechanically.

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CORLISS E. SULLIVAN, Cleveland, director of Republic Steel Corp., B. F. Goodrich Co., Pioneer Steamship Co., Standard Products Co., and the Cleveland Graphite Bronze Co., among other activities, died Feb. 14 at the age of 62.

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DR. IRA MILTOMORE, former chief surgeon of Gary works hospital of the old Illinois Steel Co., and one of Gary's pioneer physicians, died last week in Gary, aged 58 years. In 1903 Dr. Miltimore became superintendent of a small hospital in South Chicago which was maintained for plant employees of the Illinois Steel Co. In 1907, he moved to Gary as company surgeon. That company's new hospital was completed in 1910 and Dr.

Miltimore was placed in charge as superintendent, a position he held for 10 years, resigning then to enter private practice.

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WALTER BRUCE GRANT, president of the American Tube Works, Somerville, Mass., died at his home in Dorchester, Mass., on Feb. 15. Mr. Grant was born in Milwaukee 79 years ago, attended college and law school at Columbian University, now George Washington University. He practiced law in Boston many years.

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JOSEPH CONGDON BELDEN, president and chairman of the board, Belden Mfg. Co., Chicago makers of electrical wire and cables, died last week in Chicago, after an illness of several months. Mr. Belden was an outspoken critic of New Deal labor policies and was in frequent demand as a speaker on this subject. He was formerly president of the Employers' Association of Chicago, and a former first vice-president and director of the Illinois Manufacturers' Association. After graduating with a degree in philosophy from the Sheffield Scientific School of Yale in 1897, Mr. Belden founded his own company in 1902.

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WILLIAM D. SMITH, retired industrialist who founded the Ohio Machine Tool Co., Kenton, Ohio, in 1891, died Feb. 17 in Kenton at the age of 79.

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Monopoly Hearings Slated to Start Feb. 28

WASHINGTON—Officials of the Temporary National Economic Committee announced this week that the Federal Trade Commission's hearings under the monopoly inquiry will begin Feb. 28 and continue "for about two weeks."

The steel, farm machinery, rubber and sulphur industries were listed together with six others, all in the food field, to figure in the FTC phase of the inquiry. The order in which these industries will be considered was not disclosed and it was indicated that some may be held over until a future date.

M. H. Jewett, Room 301 Union Building, 1836 Euclid Avenue, Cleveland, has been appointed Cleveland district sales representative for the northern Ohio territory by the American Flexible Coupling Co. of Erie, Pa.

Suits against Steel Likely if U. S. Wins Over Tire Companies

WAshington—The Department of Justice has indicated that if it is successful in its triple damage suit instituted on Monday against 18 automobile tire manufacturers it will prosecute similar proceedings against the steel, machinery and numerous other industries which quote identical bids, the reason for the action taken against the tire manufacturers, unless they stop the practice.

Such a widespread prosecution not only would set a precedent by way of action against industries of the country but if successful would mean enormous penalties against them and an upsetting of the economic systems under which they operate.

For such industries as steel, machinery, cement, etc., this would mean abolition of the traditional delivered price basis of quoting prices and compel an f.o.b. mill method of quoting. Even in the Department of Justice in the past opposition has been expressed to abrupt destruction of the basing point system and there still is doubt that the department will proceed to such a far-reaching attempt. Nevertheless, the suit against the tire makers, who quote on a delivered price basis, is aimed directly against identical bids, no matter how they are arrived at.

Like Bids Show Guilt

Changing from the position taken by former Attorney General Homer S. Cummings that identical bids are not necessarily *prima facie* evidence of a combination in restraint of trade, the Department of Justice under the new leadership of Attorney General Frank Murphy has adopted the philosophy of Solicitor General Robert H. Jackson that like bids are evidence of guilt.

"There is no such a thing as identical costs of manufacture and consequently there should be no identical bids," it was stated at the department.

The triple damage suit against the tire companies is the first of the kind ever instituted. The complaint, a civil action, was instituted under Section 7 of the Sherman Anti-Trust Act in the United States District Court for the Southern District of New York. The department in its statement announcing institution of the suit stated that a criminal action would not compensate the Government since the maximum fine recoverable in a criminal

proceeding is \$5,000. It was added that there is no occasion to consider the propriety of seeking injunctive relief "as the particular defendants no longer submit identical bids." Damages sought against the tire manufacturers total \$1,053,474.63.

Other Industries Warned

Sounding a warning that the department will proceed against other industries if they continue to quote identical prices, the statement declared:

"If the department's position in this case is sustained by the court the decision should serve as an effective deterrent to further non-competitive bidding on government contracts."

What inspired the campaign just at this time against identical bidding is not known. It came as a surprise. For one thing the subject is scheduled for airing at the hearings before the Temporary National Economic Committee. For another thing, there is supposedly under way in the Administration for "business appeasement" though President Roosevelt himself has not given evidence of inaugurating the plan. Instead he has inquired as to what appeasement is necessary.

Should the department proceed against other industries which quote identical prices it would lay a vast task for itself as denoted by its own statement.

"This practice on the part of supposedly competing sellers has been extensive and reveals that competitive bidding on many contracts is simply unknown," said the department.

"In the opinion of the department such identical bidding, whether or not supported by other evidence, creates a presumption of a combination to fix prices. Bids identical to the last penny are not normally the result of identical cost of manufacture, identical marketing cost, and identical profit percentages independently arrived at."

January Building 39% Ahead of 1938

A STRONG upturn in building activity starting in the spring of 1938 has shown continued expansion since the opening of the new year. Contracts for private construction

projects awarded in the 37 eastern states during January recorded a 39 per cent gain over January of last year, according to F. W. Dodge Corp. The January, 1939, figure for private work amounted to \$103,757,000 as compared with \$74,630,000 for January, 1938. During December, privately-owned construction totaled \$110,036,000.

With reference to publicly-owned construction, January contracts in the 37 states amounted to \$147,916,000 as compared with \$117,601,000 for January a year ago, representing a gain of 26 per cent.

CAST IRON PIPE

Pittsfield, Mass., has contracted with Warren Pipe Co. of Massachusetts for its 1939 requirements.

Hamilton, Mass., has awarded 1000 tons of pipe of various sizes to Warren Foundry & Pipe Corp., through J. MacDonald Construction Co., Newton, Mass., contractor.

Lynn, Mass., has awarded 320 tons of 30-in. pipe to Warren Foundry & Pipe Corp.

Linden, Wis., plans pipe line extensions in water system and other water works installation, including deep-well pumping machinery and accessories. Cost about \$33,000. Financing has been arranged through Federal aid. W. G. Kirchoffer, 22 North Carroll Street, Madison, Wis., is consulting engineer.

Grand Forks, N. D., closes bids March 7 for pipe line extensions in water system; also for pumping machinery and accessory equipment, filter apparatus, clarifiers and other equipment. Cost about \$270,000. Lium & Burdick, YMCA Building, are consulting engineers.

Jefferson County Water Control and Improvement District, Port Arthur, Tex., I. E. L. Stewart, president, plans pipe line extensions in water system. Bond issue of \$121,000 has been authorized for this, water treatment plant, storage reservoir and other waterworks installation. J. B. Converse & Co., Port Arthur, are consulting engineers.

Eden Tex., plans pipe lines for water system and other waterworks installation. Fund of about \$100,000 is being arranged for this and sewage system. Freese & Nichols, Capps Building, Fort Worth, Tex., are consulting engineers.

Water Department, Toledo, Ohio., W. F. Harris, city service director, is arranging early call for bids for pipe lines for water supply project from new source on Lake Erie, including three sections of 78-in. conduit line in lake area, extending from point near Reno Beach to proposed filtration plant on east side, about 13 miles; new main pipe line for crosstown service and several new distribution lines. Bids close Feb. 24 for 72 and 42-in. pressure lines from Front and Justice Streets to intersection of Erie and Cherry Streets, about 7400 ft., with tunnel crossing under Maumee River, about 2600 ft. long. Later bids will be asked for filtration plant and equipment, Lake Erie pumping station and machinery, and other structures. Project will cost close to \$9,000,000. George N. Schoonmaker is chief waterworks engineer.

Wichita, Kan., will take bids soon for main pipe line from new water source, comprising series of 25 wells; also for pipe line extensions in distribution system, pumping station and other waterworks installation. Entire development will cost about \$2,425,000. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Snoqualmie, Wash., plans pipe line extensions and replacements in water system. Cost over \$35,000. Financing is being arranged.

FABRICATED STEEL

Lettings in better volume at 13,500 tons against 9100 tons last week . . . New projects declined to 16,450 tons . . . Plate Awards total 2555 tons.

NORTH ATLANTIC STATES AWARDS

1500 Tons, Springfield, Mass., trade school, to Lehigh Structural Steel Co., Allentown, Pa., through George A. Fuller Co.

525 Tons, Southbury, Conn., school and hospital, to Bethlehem Fabricators, Bethlehem, Pa., through E. & F. Construction Co.

500 Tons, Portsmouth, N. H., approaches, Piscataqua Bridge, to Bethlehem Steel Co., Bethlehem, Pa.

375 Tons, New York, Tremont Health Center, to Lehigh Structural Steel Co., Allentown, Pa., through A. J. Paretta Contracting Co.

365 Tons, Cumberland and Hagerstown, Md., bridge repairs, Western Maryland Railroad, to American Bridge Co., Pittsburgh.

360 Tons, Green Haven, N. Y., State prison power plant, to Lehigh Structural Steel Co., Allentown, Pa., through Edward Corning.

350 Tons, Brooklyn, 19th Avenue garage for Procurement Division, to American Bridge Co., Pittsburgh.

325 Tons, Binghamton, N. Y., County hospital and jail, to Bethlehem Steel Co., Buffalo.

310 Tons, Cumberland and Hagerstown, Md., bridge repairs, Western Maryland Railroad to Bethlehem Steel Co., Bethlehem, Pa.

310 Tons, New York, retail market, Essex Street, to Bethlehem Steel Co., Bethlehem, Pa., through Lieb Construction Co., New York.

250 Tons, Glen, N. Y., State bridges, SH-1963, to Bethlehem Steel Co., Bethlehem, Pa.

240 Tons, Bradford, Vt., bridge, to American Bridge Co., Pittsburgh, through Hagan & Thibodeau Construction Co.

215 Tons, New York, scaffolds, Cathedral of St. John the Divine, to Bethlehem Fabricators, Inc., Bethlehem, Pa., through William Crawford, Inc.

190 Tons, Philadelphia, State highway bridge, to Bethlehem Steel Co.

175 Tons, Baltimore, building, Home for Incurables, to Baltimore Steel Co., Baltimore.

160 Tons, Croton-on-Hudson, N. Y., grade school, to Bethlehem Steel Co., Bethlehem, Pa.

150 Tons, Brooklyn, transfer bridge, Brooklyn Eastern District Terminal, to American Bridge Co.

150 Tons, New Rochelle, N. Y., incinerator, to Levine Brothers Iron Works, Yonkers, N. Y., through August Severio Construction Co.

100 Tons, Barre, Vt., municipal auditorium, to American Bridge Co., Pittsburgh.

SOUTH AND SOUTHWEST

950 Tons, Walton County, Fla., Choctawatchee Bay bridge, to Bethlehem Steel Co.

300 Tons, Oklahoma City, beam spans, to Capitol Steel & Iron Co., Oklahoma City.

215 Tons, Wheeler and Treutlen Counties, Ga., bridge, to Nashville Bridge Co., Nashville, Tenn.

205 Tons, Nububee County, Miss., bridge, to Jones & Laughlin Steel Corp., Pittsburgh, through H. E. Wolf Construction Co.

205 Tons, Williamson County, Tex., bridge, to Mosher Steel Co., Dallas, Tex., through Dean Ward.

150 Tons, Smith County, Tex., bridge, to Austin Brothers, Dallas, Tex., through Gifford Hall & Co.

140 Tons, Cedartown, Ga., warehouse for Goodyear Tire & Rubber Co., to H. K. Ferguson Co., Cleveland, general contractor.

122 Tons, Fernandina, Fla., miscellaneous material for Fernandina Pulp Co., to unnamed fabricator, through Rayonier, Inc.

110 Tons, Dallas, Tex., Veterans' facilities, to J. B. Klein Iron & Foundry Co., Oklahoma City.

110 Tons, Kimble County, Tex., bridge, to Austin Brothers, Dallas, Tex.

105 Tons, Comanche County, Tex., bridge, to Mosher Steel Co., Dallas, Tex.

CENTRAL STATES

1001 Tons, Waterloo, Iowa, bridge, to Bethlehem Steel Co., Bethlehem, Pa.

350 Tons, Cleveland, Big Creek intercepting sewer and bridge, to R. C. Mahon Co., Detroit, through Lombardo Bros. Construction Co., Cleveland.

350 Tons, Steubenville, Ohio, senior high school, to Bethlehem Steel Co.

302 Tons, Fort Wayne, Ind., bakery, to Fort Wayne Structural Steel Co., Fort Wayne, through Max Irmsher & Sons.

285 Tons, Columbus, Ohio, service building, F. & R. Lazarus & Co., to C. E. Morris Co., Columbus.

179 Tons, Bloomington, Ind., science building, to Bedford Foundry & Machine Co., Bedford, Ind., through John E. Ericsson & Co., Chicago.

140 Tons, Cincinnati, Ohio, Phillips tank factory building, to Jones & Laughlin Steel Corp., Pittsburgh.

120 Tons, Ironton, Ohio, city bridge, to Meehan Structural Products Co., Ironton, Ohio, through Miller & French.

100 Tons, Chicago, coast artillery garage, to Mississippi Valley Structural Steel Co., St. Louis.

100 Tons, Mason City, Iowa, public library, to Wendnagel & Co., Chicago, through A. Smith & Co., Chicago.

WESTERN STATES

925 Tons, Magna, Utah, viaducts and bridges, Bingham & Garfield Railroad, to American Bridge Co., Pittsburgh.

310 Tons, Salt Lake City, Deer Creek Aqueduct, Bureau of Reclamation, to Structural Steel & Forge Co., Salt Lake City.

SOUTH AMERICA

130 Tons, Honduras, South America, highway bridge, to Kansas City Structural Steel Co., Kansas City, Kan., through Haliburton Oil Well Cementing Co.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

6000 Tons, Ulster, Orange and Dutchess Counties, N. Y., Delaware Aqueduct, contract 318; bids received by Board of Water Supply, New York, until March 2.

1230 Tons, Che'sea-Everett, Mass., metropolitan district sewer, sections 102 and 103.

700 Tons, Cambridge, Mass., Cottage Farm overpass.

500 Tons, Philadelphia, additions and alterations for Horn & Hardart; bids Feb. 28.

400 Tons, Nunda, N. Y., school; bids March 2.

350 Tons, Yonkers, N. Y., highway bridge.

300 Tons, Washington, Thomas Jefferson Memorial.

235 Tons, East Bloomsfield, N. Y., school building.

200 Tons, Brooklyn, shoring material, George H. Flint Corp.

200 Tons, Wilkes-Barre, Pa., power house for Stegmeyer Brewing Co.; bids in.

150 Tons, Millville, N. J., armory.

115 Tons, Pittsburgh, shop and laboratory, Bureau of Mines.

Unstated tonnage, Buffalo, bakery for Loblaw Groceries, Inc.

Unstated tonnage, Niagara Falls, N. Y., office building for Hooker Electro-Chemical Co.; bids March 2.

THE SOUTH

300 Tons, Norfolk, Va., underpass, Norfolk & Western Railroad.

253 Tons, Quitman, Miss., bridge, bids in.

250 Tons, Shreveport, La., overpass.

CENTRAL STATES

8600 Tons, Rock Island, Ill., Mississippi River bridge, American Bridge Co., low bidder (previously reported).

430 Tons, Toledo, Ohio, Girls' Trade School; bids Feb. 23.

400 Tons, Lorain, Ohio, Baltimore & Ohio underpass; bids March 15.

300 Tons, Youngstown, Ohio, city hall; Schirmer-Peterson Co., Cleveland, general contractor.

200 Tons, Toledo, Ohio, library.

200 Tons, Sault Ste. Marie, Mich., recreation building; new bids, Feb. 27.

200 Tons, Rathbun and Blakesburg, Iowa, railroad bridges.

140 Tons, Phalanx, Ohio, building for Industrial Silica Co.; bids in.

WESTERN STATES

1000 Tons, Avon, Cal., Pacific Gas & Electric Co., steam plant.

600 Tons, Pikes Peak, Colo., building over Summit House, Manitou & Peak Railroad.

600 Tons, Salt Lake City, Utah, Mountain States Telephone Co. Building.

500 Tons, Denver, Bureau of Reclamation, trash racks; bids March 7.

450 Tons, Boulder City, Colo., substation, Spec. 1187-D, Bureau of Reclamation.

115 Tons, Oroville, Cal., overcrossing, bids Feb. 27.

100 Tons, Rocky Mountain National Park, Colo., Bureau of Reclamation bridges (Spec. 1196-D); bids March 8.

FABRICATED PLATES

AWARDS

1140 Tons, Pittsburgh, barges for Central Barge Co., to Bethlehem Steel Co., Bethlehem, Pa.

1035 Tons, Harrisburg, Pa., first section 42-in. water pipe, to National Tube Co., Pittsburgh.

280 Tons, Prilliman, Va., deck plate girder span, Norfolk & Western Railroad, to Virginia Bridge Co., Roanoke, Va.

100 Tons, Fort Peck, Mont., United States Engineers, to Central Iron & Steel Co., Harrisburg, Pa.

PENDING PROJECTS

1600 Tons, Chelsea-Everett, Mass., metropolitan district sewer, sections 102 and 103.

300 Tons, Tucson, Ariz., elevated tank; new bids Feb. 25.

Unstated tonnage, Avon, Cal., Pacific Gas & Electric Co., boilers for steam plant.

Unstated tonnage, Martinez, Cal., Pacific Gas & Electric Co., boilers for steam plant.

SHEET PILING

PENDING PROJECTS

165 Tons, Chelsea-Everett, Mass., metropolitan district sewer, sections 102 and 103.

New Alloy Booklet

By Carnegie-Illinois

A NEW book, "U.S.S. Carilloy Steels," which describes the hardening of steel, based both on practical and fundamental behaviors, has been published by Carnegie-Illinois Steel Corp. This complete handbook on alloys lists steel making elements, their commercial uses and effects in steel and the types of steel containing them.

The iron-carbon diagram is featured and its use for hardening and annealing operations is explained. Considerable data on quenching practices and physical properties of different grades of alloy steels after quenching is included.

Among the many illustrations are charts, some never before published, and pictures of alloy steel making, testing methods and research laboratory equipment. Plant and laboratory photographs were all taken in Carnegie-Illinois mills.

The practical aspect of the book is based on hardening behavior when various sizes of steel bars are quenched in various media and represents recent work in Carnegie-Illinois laboratories. Copies of the book (\$1) are available at Carnegie-Illinois offices in Pittsburgh and Chicago.

Acetylene Association Plans Comprehensive Meeting

PRESENTATION of more than 16 technical papers, demonstrations and round table discussions, a plant inspection trip, and a business meeting, will feature the 39th annual convention of the International Acetylene Association, to be held at the Rice Hotel, Houston, Tex., March 8, 9 and 10.

The technical sessions, some to be held simultaneously, will cover welding and cutting in petroleum refining and in petroleum production and distribution; also surface hardening and hard surfacing, machine oxy-acetylene cutting, and general applications of the oxy-acetylene process.

The opening session, at noon, on Wednesday, March 8, will include addresses by J. W. Evans, vice-president, U. S. Chamber of Commerce, Houston; Elmer H. Smith, president, Commercial Gas Co., Minneapolis, and president of the I.A.A.; and J. H. Van Deventer, editor, *THE IRON AGE*. The annual luncheon and business meeting, to be held at noon, March 9, will include an address by George A. Hill, president, Houston Oil Co., and vice-president, American Petroleum Institute. A number of committee reports will be submitted, and the results of election of new officers will be announced. The plant of the Hughes Tool Co., Houston, will be visited on the morning of March 10. The technical program is as follows:

MARCH 8, 2.30 P. M.

Session "A," Welding and Cutting in Petroleum Refining—Chairman: R. L. Dudley, president, Gulf Publishing Co., Houston. Papers: Uses of the Oxy-Acetylene Process in Petroleum Refineries, by Henry Jouette, Magnolia Petroleum Co., Beaumont, Tex.; Welding Fittings, by E. Hall Taylor, Taylor Forge & Pipe Works, Chicago, and Oxy-Acetylene Welding of High-Pressure Piping, by A. N. Kugler, Air Reduction Sales Co., New York.

Session "B," Welding and Cutting in Petroleum Production and Distribution—Chairman: L. H. Courtwright, welding foreman, Reed Roller Bit Co., Houston. Papers: Gas Welded Oil Well Casings, by G. R. Milton, Sinclair Prairie Oil Co., Arp, Tex.; Latest Practices in the Pipe Line Field, by W. B. Poor, construction engineer, United Gas Pipe Line Co., Houston; Maintenance of Oil Field Equipment, by C. G. Alhart, Texas Iron Works, Houston, and Oxy-Acetylene Application of Hard-Facing Materials to Drill Bits, by C. H. Shapiro, chief metallurgist, Reed Roller Bit Co.

MARCH 8, 8.15 P. M.

Round Table Discussion—Short Forum, demonstration meeting followed by simultaneous group meetings for open discussion of practical welding and cutting problems. General

chairman: H. C. Boardman, consulting engineer, Chicago Bridge & Iron Co., and president of the American Welding Society. Demonstrations will include flame hardening, hard-facing, testing, and casing welding. Subjects of round table discussion will include: Flame hardening, fire prevention and safety, non-ferrous metals, alloy steels, hard-facing, testing of welds, oil well casing welding, salvaging and reclamation, and safe ending of boiler tubes.

MARCH 9, 2.30 P. M.

Second Technical Session, Surface Hardening and Hard Surfacing—Featuring a special lecture on Surface Hardening and Hard Surfacing, by Dean C. E. MacQuigg, college of engineering, Ohio State University, followed by a panel discussion led by Dr. A. B. Kinzel, chief metallurgist, Union Carbide & Carbon Research Laboratories, Inc., New York, chairman of the session, and participated in by John J. Crowe, research engineer, Air Reduction Sales Co., New York, and Ernest E. Thum, editor, *Metal Progress*, Cleveland.

MARCH 10, 2.30 P. M.

Third Technical Session, Session "A," Machine Oxy-Acetylene Cutting—Chairman: A. I.

Sellers, Supt. of Shops, Southern Pacific R.R., Houston; Flame Cutting with Small Machines, by Walter B. Van Wart, vice-president, Wyatt Metal & Boiler Works, Dallas; Oxy-Acetylene Shape-Cutting of Drilling Equipment Parts, by L. W. Stahl, Emsco Derrick & Equipment Co., Houston; Plate-Edge Preparation, by J. H. Troger, Federal Shipbuilding & Dry Dock Corp., Kearny, N. J., and Economics of Machine Gas Cutting, by G. M. Deming, Air Reduction Sales Co., New York.

Session "B," General Applications of the Oxy-Acetylene Process—Papers: Plumbing, Heating and Air Conditioning, by Frank Wallace, C. Wallace Plumbing Co., Dallas; Safe-Ending of Boiler Tubes, by Frank Page, chief boiler inspector, State of California, San Francisco; Flame Hardening of Oil Field Equipment, by M. O'Hara, International Derrick & Equipment Co., Beaumont, Tex., and Agricultural Uses of Welding and Cutting, by Mills P. Byron, Agricultural Experiment Station, College Station, Tex.

The round table discussions will be held at the San Jacinto High School. The group meetings will be held simultaneously, and each will be in charge of a group chairman who will be assisted by guest technical advisers. The headquarters of the International Acetylene Association are at 30 East Forty-second Street, New York.

Small Companies Ask Further Delay in Steel Pay Minimums

WASHINGTON—Roberts B. Thomas, counsel for the committee of 29 small Eastern iron and steel producers, on Monday asked Assistant Secretary of Labor Charles V. McLaughlin for a postponement until April 3 of the department steel wage order on the grounds that the effect of the 62½c. minimum rate prescribed for Eastern mills will be "more destructive" to the small producers that at first was indicated.

Mr. Thomas, who had previously asked for a 60-day delay and received a 30-day postponement of the order to March 1, told the Labor Secretary that difficulties facing the members of his group "are even more pressing now than in January for the deeper we go into the matter the more destructive the effect of the determination on the small producers appears."

The committee early last week asked the Temporary National Economic Committee to study the effect of the steel wage order paying particular attention to the possibilities of monopoly.

Order's Scope Limited

Meanwhile, the Labor Department's Public Contracts Division faced the prospect this week of having the scope

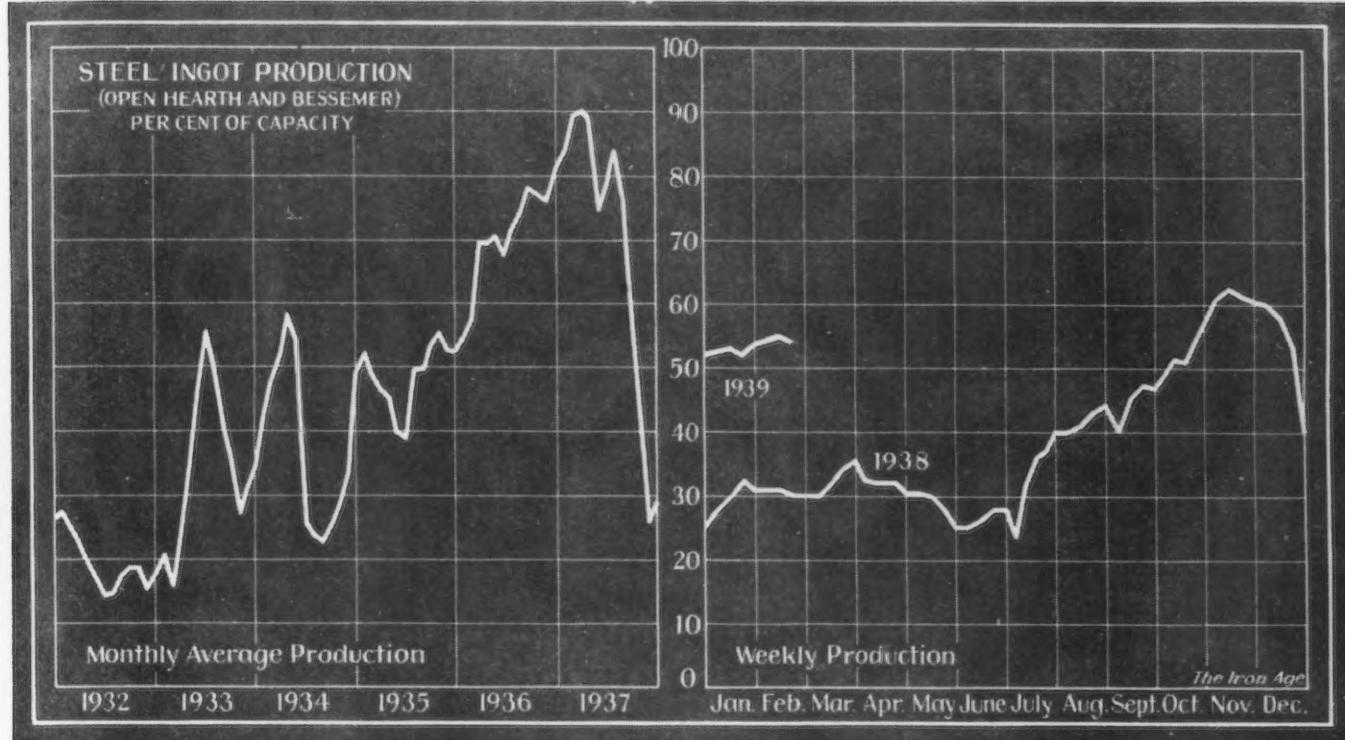
of the steel wage order limited by the Treasury's Procurement Division, which has interpreted the order to mean that members of the industry selling coated, insulated or cast steel to the Government can do so without adhering to the prescribed minimum wage rates. Axles are the only forged item that will be affected by the order.

The Procurement Division made this interpretation in its "Circular Letter No. 352" which was sent out to heads of all Government departments and establishments late last week as part of the customary procedure followed just before a minimum wage order is scheduled to take effect.

The Public Contracts Division took the view that the exclusion of "unspecified coated, insulated, forged or cast items" unduly restricts the scope of the order.

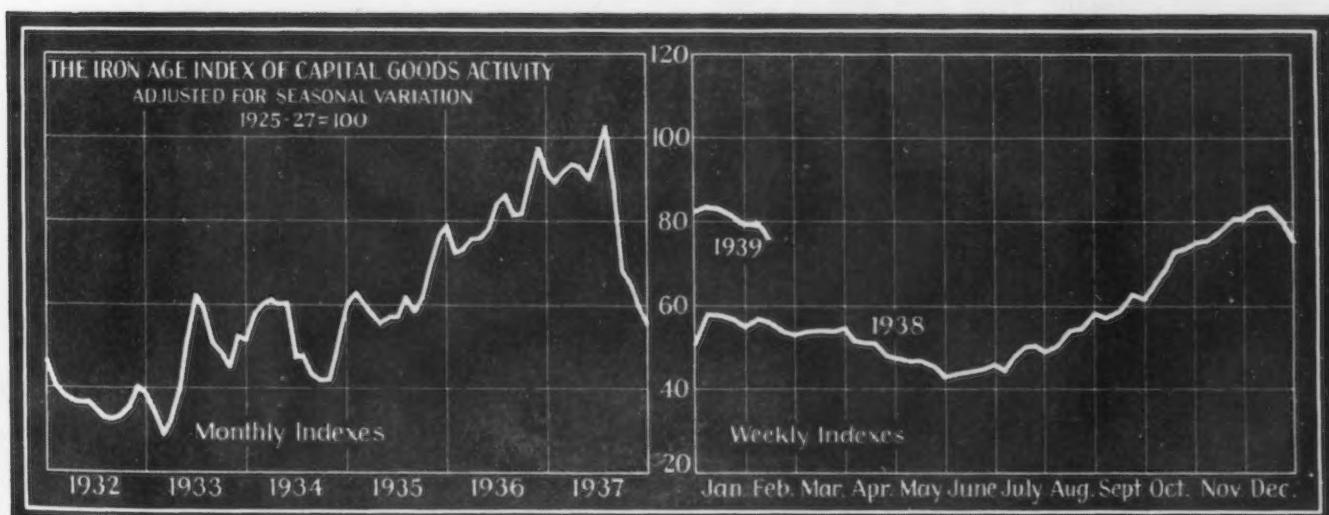
It was understood that the Public Contracts Division was pushing in the direction of getting the problem cleared up so that other Government departments will be advised of any modifications in the instructions before the minimum wage rates go into effect on March 1.

Ingot Production Declines One Point to 54 Per Cent



District Ingot Production, Per Cent of Capacity	Pittsburgh	Chicago	Valleys	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	Southern	S. Ohio River	Western	St. Louis	Eastern	Aggregate
CURRENT WEEK..	48.0	53 1/2	45.0	38.0	51.0	29.5	86.0	79.0	72.0	53.5	60.0	60.0	60.0	54.0
PREVIOUS WEEK..	47.0	53.0	49.0	37.0	55.0	36.5	90.0	93.0	72.0	53.5	60.0	53.5	60.0	55.0

Capital Goods Activity Off 2.4 Per Cent in Week



OUTPUT of the capital goods industries dropped 2.4 per cent in the week ended Feb. 18, according to THE IRON AGE index. This decline, the fifth in as many weeks, brings the index down to 76.7 per cent of the 1925-27 average. This position represents a drop of 8 points or 6.8 per cent from the present year's high of 83.5 reached in the second week of January, and, excepting the Christmas week, is the lowest since the seven-day period ended Nov. 19, 1938. Four components of the index were lower for the week, with only the Pittsburgh series showing a gain. The Pittsburgh improvement was due in part to the movement of freight which had accumulated for several weeks due to floods and cold weather.

	Week Ended Feb. 18	Week Ended Feb. 11	Comparable Week
Steel ingot production ¹	77.7	78.1	40.6 117.4
Automobile production ²	84.4	89.6	61.1 129.3
Construction contracts ³	104.3	105.6	75.4 132.9
Forest products carloadings ⁴	44.8	50.2	49.8 108.1
Production and shipments, Pittsburgh District ⁵	72.3	69.7	55.5 117.2
Combined index	76.7	78.6	56.5 121.0

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. Engineering News-Record; 4. Association of American Railroads; 5. University of Pittsburgh.

... SUMMARY OF THE WEEK ...

... **Ingot production off slightly to 54 per cent.**

... **Steel scrap composite highest since October, 1937.**

... **Changes in prices on galvanized material, barbed wire.**

ALTHOUGH steel ingot production this week has dipped a point to 54 per cent of the industry's capacity, the strength of steel scrap prices seems to point to an early resumption of an upward trend. An advance at Chicago brings THE IRON AGE scrap composite price up to \$15.08, the highest level since October, 1937, and 8c. above the 1938 peak for this index.

While the trend of steel buying in February has not been uniformly upward, several important products have registered gains over the January volume. In all probability the declines in operations which have occurred this week in several districts are not so much a reflection of poor steel business as an indication of over-anticipation by some steel companies, which have built up larger stocks of raw and finished steel than are currently required.

Operations have moved upward slightly in the two largest districts, Pittsburgh and Chicago, but these gains have been more than offset by reduced output in several areas, notably Youngstown, Cleveland-Lorain, Wheeling-Weirton, Buffalo and Detroit. The decline at Detroit from 93 per cent, which has been the rate there for two weeks, to 79 per cent, was admittedly due to an excess stock of ingots, so two open-hearth furnaces were taken off by an independent plant.

Caution marks the buying policies of all steel users, as it has for some time, but the orders being received by the mills are numerous, indicating a broadening of activity. Sheet and strip business suffers by reason of the lean buying in the automobile industry and the fairly large stocks carried over by a good many consumers and jobbers from the heavy shipments brought about by last fall's low-price coverages.

PRICE advances ranging from \$10 to \$56 on automobiles in the lower-price class have been made within the past few days, but it appears that these have been put into effect by local dealers in various cities rather than by the manufacturers. What the effect of these advances may be on automobile sales is not clear in view of the short time that has elapsed since they were announced. The

ostensible reason for the price rises is to give dealers a larger trading margin in exchange for used cars.

Meanwhile, the automobile manufacturers continue to gage their production schedules to actual orders in hand, and they are buying steel in the same manner. The steel trade expects larger orders for automobile steels next month. As stocks of finished cars are low, the expected spring rise in automobile sales will be quickly reflected in assemblies.

Railroad buying is still one of the major factors of current interest. The New York Central will buy 50,000 tons or more of rails and several thousand tons of accessories, the Chicago & North Western will buy 20,000 tons of rails, and the Chicago & Eastern Illinois has ordered 3750 tons from Chicago mills.

The Milwaukee Road has approved a budget of \$11,000,000 to provide for numerous betterments, including the construction in its own shops of 1000 steel box cars, 75 cabooses and repair of 26 passenger cars. The Union Pacific has distributed orders for parts for 2000 cars it will build in its own shops. The Illinois Central will soon buy 1000 hopper cars, the Chicago & North Western expects to buy 900 cars and the Santa Fe will rebuild 500 refrigerator cars in its own shops. Other roads are contemplating equipment purchases, but in some instances financing must be arranged.

There is an unfavorable note in the small amount of fabricated structural steel work now coming into the market. For the third week, awards of fabricated structural steel have been unusually light. They were only 13,500 tons in the past week and only 16,400 tons of new projects came out for bids. A water pipe line at Bethlehem, Pa., to be fabricated by the Lock Joint Pipe Co., Ampere, N. J., will take 8500 tons of steel, mostly rods and sheets.

ALTHOUGH general price advances for the second quarter are held to be very unlikely either in steel or pig iron, there are further indications that weak spots which have arisen largely in secondary steel markets will be strengthened, two moves in that direction having been made within the past week. In one case mills have withdrawn the functional allowances that have been granted to jobbers on galvanized flat sheets and galvanized formed roofing, amounting to \$2 a ton on flat sheets and \$4 a ton on roofing. An outright advance of \$2 a ton on barbed wire has been announced. Hereafter all merchant wire products will be considered as individual items instead of being based on the wire nail price. A clarification of the deduction and extra set-up on sheets and strip in particular and possibly some other products is expected within the near future.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

	Feb. 21, 1939	Feb. 14, 1939	Jan. 24, 1939	Feb. 21, 1938
Per Gross Ton:				
Rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$42.50
Light rails: Pittsburgh, Chicago, Birmingham	4.00	4.00	4.00	4.30
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	37.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	37.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	37.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	4.00	4.00	4.00	4.30
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland, Cleveland	43.00	43.00	43.00	47.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	2.10

Finished Steel

	Cents Per Lb.:	2.25	2.25	2.25	2.45
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.25	2.25	2.25	2.45	
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.25	
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.25	
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.70	2.70	2.70	2.90	
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.80	2.80	2.80	3.00	
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.15	2.15	2.15	2.40	
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.95	2.95	2.95	3.20	
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.80	
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.15	2.15	2.15	2.25	
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.20	3.20	3.20	3.20	

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

Finished Steel

February 21, 1939
One week ago
One month ago
One year ago

2.286 a Lb.
2.286
2.286
2.512c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

HIGH LOW

1939.....	2.512c., May 17	2.211c., Oct. 18
1938.....	2.512c., Mar. 9	2.249c., Jan. 4
1937.....	2.249c., Dec. 28	2.016c., Mar. 10
1936.....	2.062c., Oct. 1	2.056c., Jan. 8
1935.....	2.118c., Apr. 24	1.945c., Jan. 2
1934.....	1.953c., Oct. 3	1.792c., May 2
1933.....	1.915c., Sept. 6	1.870c., Mar. 15
1932.....	1.981c., Jan. 13	1.883c., Dec. 29
1931.....	2.192c., Jan. 7	1.962c., Dec. 9
1930.....	2.223c., Apr. 2	2.192c., Oct. 29
1929.....	2.192c., Dec. 11	2.142c., July 10

Pig Iron

\$20.61 a Gross Ton
20.61
20.61
23.25

Based on average for basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

HIGH LOW

1939.....	\$23.25, June 21	\$19.61, July 6
1938.....	23.25, Mar. 9	20.25, Feb. 16
1937.....	19.73, Nov. 24	18.73, Aug. 11
1936.....	18.84, Nov. 5	17.83, May 14
1935.....	17.90, May 1	16.90, Jan. 27
1934.....	16.90, Dec. 5	13.56, Jan. 3
1933.....	14.81, Jan. 5	13.56, Dec. 6
1932.....	15.90, Jan. 6	14.79, Dec. 15
1931.....	18.21, Jan. 7	15.90, Dec. 16
1930.....	18.71, May 14	18.21, Dec. 17
1929.....	18.59, Nov. 27	17.04, July 24

Steel Scrap

\$15.08 a Gross Ton
15.00
15.00
13.67

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

.. THIS WEEK'S MARKET NEWS ..

STEEL OPERATIONS

... Rate for industry declines one point to 54%

STEEL ingot production for the industry as a whole has declined one point this week to 54 per cent of capacity.

The two major districts, PITTSBURGH and CHICAGO, have gained slightly, the former one point to 48 per cent and the latter a half point to 53½ per cent. EASTERN PENNSYLVANIA is also up one point to 38 per cent.

In several of the other districts, however, operations are lower. YOUNGSTOWN is down four points to 45 per cent; CLEVELAND-LORAIN is also off four points to 51 per cent; the WHEELING-WEIRTON area has declined four points to 86 per cent; BUFFALO is down to 29½ per cent from 36½; DETROIT has dropped from 93 per cent to 79 per cent owing to a reduction of two open hearth furnaces by one steel plant. In the BIRMINGHAM district and in SOUTHERN OHIO operations are unchanged.

To some extent the decline in production has been brought about by an excess inventory position of some mills in raw and semi-finished steel.

NEW BUSINESS

... February bringing little or no improvement

AGGREGATE business at PITTSBURGH last week was a shade below the previous week and, although there is some evidence of a slower tempo in the rate of incoming orders, sales data so far disclose little more than the variations which have existed since the middle of January. The current cautious attitude on the part of steel buyers has caused steel producers to pin their hopes of a better rate of activity on March possibilities.

Orders being received by CLEVELAND and YOUNGSTOWN steel producers remain numerically good and well diversified, but are individually small from the tonnage standpoint. Railroads, automotive and agricultural implement industries, refrigerator manufacturers and many other consumers are buying for immediate use but not for any length of time ahead. Mills are able to ship promptly.

February bookings in some CHICAGO sales offices have been encouraging, running 25 to 30 per cent ahead of January in one instance, and in no cases is discouragement being expressed. Throughout the month railroad demand has been of importance and, judging from inquiries and advance reports on hand of prospective buying, the carriers will continue to be a dominant factor. Ordering of rails will be less active, since most roads buy only once annually, but several CHICAGO district rail orders are yet to be released. Car builders, equipment suppliers and steel sellers are looking forward to a fair amount of rolling stock construction during 1939. Of current importance is the Northwestern's announcement that 900 cars will be built and 20,000 tons of rails purchased, the buying of steel and parts for the 2000 cars the Union Pacific is constructing, 500 Santa Fe refrigerator cars, which that road is rebuilding in its own shops, and 1000 box cars and 75 cabooses the Milwaukee will build.

In NEW YORK the outstanding new item is an inquiry from the New York Central for 50,000 tons or more of rails, together with several thousand tons of accessories. About 8500 tons of steel, half rods and half sheets, will be required by the Lock Joint Pipe Co. for a water pipe line it will fabricate for Bethlehem, Pa.

PRICES

... Barbed wire prices advanced ... Jobbers' discounts on galvanized material discontinued

TWO changes in the steel price structure have been made within the past week in an apparent effort to plug up weak spots in secondary markets.

On galvanized flat sheets and roofing the carload functional allowance to jobbers was discontinued, while an advance of \$2 a ton was put into effect on barbed wire in an attempt to disassociate these products from wire nails.

The jobbers' allowance on galvanized material has been a source of difficulty in the marketing of these products as long as it has been in existence. The practice of some jobbers in splitting this allowance with their customers, thereby competing with the

mills on carload business at cut prices has frequently been one of the contributing causes of general price weakness.

The sudden increase of \$2 a ton in prices of barbed wire is an indication that merchant wire products are definitely on a "change without notice" price policy. Galvanized sheet products are also subject to change without notice.

In view of the substantial strengthening of steel prices since last fall, it is logical to expect in the near future clarification of the extra and deduction setup governing the sale of some steel products, particularly those in the flat rolled category.

Continued efforts are being made to improve the resale prices of merchant pipe, reinforcing bars and nails, which have been especially weak in secondary markets.

PIG IRON

... Melt may be increasing but buying shows no gains

INDICATIVE of a gain in foundry pig iron melt, shipments of foundry coke have been gaining in some areas, being up slightly over January in the CHICAGO district and as much as 10 per cent in the territory served by CLEVELAND and YOUNGSTOWN furnaces. Other than this factor, the improvement in foundry melt has not reflected itself in better business for suppliers. Pig iron shipments are in most instances holding up to the level of January, but there is very little new buying. Books are not yet open for the second quarter, and as yet consumers have not shown much interest in making commitments for that period. Solicitation of second quarter contracts by the furnaces may begin, however, within the next two weeks. There is no talk of higher prices.

There has been a decrease of one active furnace in the BIRMINGHAM district, Woodward Iron Co. having blown out its No. 1 stack for repairs. Carnegie-Illinois Steel Corp. is blowing in an additional furnace this week at its Duquesne, Pa., works.

With low stocks in the hands of consumers, it is the belief of the trade that further improvement in foundry operations will be of almost immediate aid to the furnaces.

PLATES

... Railroad work and tank construction principal factors

LIGHT tank work and miscellaneous consumption has accounted for most of the recent plate business placed with CHICAGO mills. Some additional demand will come from car building program started and in prospect, notably the Union Pacific decision to build 2000 cars in the road's own shops.

At CLEVELAND and YOUNGSTOWN inquiries and orders from tank fabricators recently have contributed toward maintaining activity of plate producers.

National Tube Co. has been awarded a 42-in. water supply line at Harrisburg, Pa., which will require 1028 tons of plates. Bethlehem Steel Co. will supply barges for the Central Barge Co., requiring 1140 tons of plates.

There has been a slight improvement in plate rollings in EASTERN PENNSYLVANIA, this being a reflection of recent shipyard releases and releases from Government yards on orders some months old. Otherwise the EASTERN plate market is quite dull. Miscellaneous demands are erratic and in small volume, and what export business there is available is carrying a very low price.

Substantial boiler plate tonnage will be required for two steam generating plants to be constructed within the next 30 days by the Pacific Gas & Electric Co. at Avon and Martinez, Cal.

Bids will be received by the Bureau of Reclamation, Denver, March 10, for fabricated pipe and fittings for Grand Coulee Dam.

STRUCTURAL STEEL

... 1500-ton Springfield school job to Lehigh Structural Steel

AWARDS of 1500 tons for a trade school at Springfield, Mass., to Lehigh Structural Steel Co., Allentown, Pa., and of 1000 tons of a Waterloo, Iowa, bridge to Bethlehem Steel Co. are reported in a week of declining business. Much structural steel required for projects awarded in the past few months probably will be rolled and shipped during March, April and May, according to present indications. PITTSBURGH producers express hope for a pick up in privately-financed projects.

Except for a 6000-ton inquiry covering contract 318 of the Delaware aqueduct, the NEW YORK market is featureless, with fabricators' backlog

there and at other points steadily diminishing. American Bridge Co. was low bidder on the 8600-ton bridge at Rock Island, Ill. At CHICAGO a slight increase in private construction is reported and the number of projects in the preliminary stage in the NEW YORK area suggests more activity soon.

SEMI-FINISHED STEEL

... Shipments to sheet and tin mills fairly good

SEMI-FINISHED steel demand was off some during the past week but the drop in new business is not considered significant. Movement of sheet and tin bars to non-integrated mills continues fairly heavy.

RAILROAD BUYING

... New York Central to Order 50,000 tons or more of rails

THE New York Central System is taking bids up to March 3 on rails and track accessories. No definite tonnage is given in the inquiry, but the purchases are expected to amount to 50,000 tons or more, together with several thousand tons of accessories. The Chicago & North Western is contemplating the purchase of 20,000 tons of rails. Chicago & Eastern Illinois has ordered 3750 tons of rails from Carnegie-Illinois Steel Corp., and 1250 tons from Inland Steel Co. A decision to double the order is pending.

The Illinois Central is taking prices on 1000 hopper cars, the Chicago & North Western is considering the purchase of 900 freight cars, the Santa Fe is asking for bids for parts for the rebuilding of 500 refrigerator cars in its own shops, and the Milwaukee Road has approved a budgetary item for the construction of 1000 steel box cars and 75 cabooses, and the modernization of 26 passenger cars in its own shops. Six diesel switching locomotives will be acquired on a lease-purchase basis. Improvements in the Minneapolis passenger station and changes in the Milwaukee wheel foundry are to be made. Total cost of this program will exceed \$11,000,000. The Union Pacific, which recently announced that it would build 2000 freight cars in its own shops, has ordered underframes for 1500 cars from the Mount Vernon Car Mfg. Co. and for 500 from the Pacific Car & Foundry Co.

The Spokane, Portland & Seattle Railway has ordered 1500 tons of track supplies from the Bethlehem Steel Co.

SHEETS AND STRIP

... Discounts to jobbers on galvanized material discontinued

EFFECTIVE Feb. 14, the functional discount of \$2 a ton on flat galvanized sheets and the functional discount of \$4 a ton on galvanized roofing and siding, were discontinued. Furthermore, prices on these products are subject to change without notice. The direct shipment allowance to jobbers which, on flat galvanized, formerly amounted to \$2 a ton regardless of quantity, now applies to less carload lots, there being no allowance on a minimum carload or more. The direct shipment allowance to jobbers on galvanized formed roofing and siding which was formerly \$2 a ton regardless of quantity, now applies on shipments of gages 26, 28 and 29 of under 80,000 lb., there being no direct shipment allowance on formed roofing products involving 80,000 lb. or more.

While the change was effective immediately upon announcement, old contracts are expected to be protected to the end of the quarter. Thus, the major test will not come immediately, as most jobbers are well covered.

CLEVELAND and YOUNGSTOWN producers of flat rolled material report that the auto industry has not yet made any large buys of consequence. Demand from other consuming sources remains light.

Total sheet business at PITTSBURGH has changed but little from a week ago but the size of fill-in orders from the automobile industry has increased some in the past few weeks. Miscellaneous demand also continues to expand at a slow rate. In view of the strengthening which has occurred in the price structure of various steel products since last fall, it is logical to expect in the near future a clarification of the deduction and extra setup on various steel items, notably sheets and strip.

In CHICAGO, demand for sheets is little changed from the levels of the past few weeks. With automobile production continuing hand-in-hand with actual retail sales, and inventories of steel and finished cars low, any increase in consumer interest likely will be reflected immediately in improved sheet buying. With the date of the New York show set for Oct. 15, it is believed there that some buying for 1940 models may be seen as early as April and May. Farm equipment and tractor makers are taking sheets in

moderate quantities, with the former tapering off gradually.

A small improvement in galvanized demand in SOUTHERN OHIO the past week was believed to have resulted from price announcements which became effective Feb. 14. Automobile sheets are still sluggish with the bulge expected next month. Household manufacturers and miscellaneous users contribute a steady demand.

Seasonal business in sheets has been especially disappointing in the ST. LOUIS area. Manufacturers of stoves, refrigerators and housewares have been buying lightly, because, they say, early business has been disappointing to them.

WIRE PRODUCTS

... Galvanized barbed wire prices advanced \$2 a ton

GALVANIZED barbed wire prices were advanced \$2 a ton, effective Feb. 15, two-point cattle wire in 80-rod spools becoming \$2.62 per spool in straight carloads. (Note that new price on this item is per spool instead of per 100 lb.) Galvanized twisted barbless wire is up \$2 a ton to 3.30c. a lb. Published nail prices are unchanged.

In the past there has been a disposition to base the prices of various merchant wire items on the base price of nails. This practice has been discontinued and all merchant wire products are priced as individual items, having no relationship with wire nails or any other merchant wire product.

Demand for merchant wire products continues to be light in most markets. There is a fairly good demand, which is showing some improvement, for manufacturers' wire.

REINFORCING BARS

... Awards, inquiries fall off at most points

CONCRETE bar orders at PITTSBURGH are about as active as a week ago with producers looking for a greater number within the next month or so. Inquiries and awards have tapered. It is understood there is still a fair amount of publicly financed work pending. Current business in the NEW YORK district is very light. New work is developing in better volume, with 900 tons for contract 318 of the Delaware aqueduct

and 782 tons for several bridges in Westchester County outstanding.

John Marsch, Inc., was low contractor on the fourth section of CHICAGO's subway project, involving about 3150 tons of bars. The fifth section of the subway requiring about 3650 tons of bars will be out for bids March 9.

TUBULAR GOODS

... No improvement noted in volume of pipe sales

TUBULAR goods demand at PITTSBURGH is virtually unchanged from the rate of weekly activity noted since the middle of January. Producers expect support within the next month from oil companies. No important pipe lines are in prospect, but the volume of small miscellaneous line pipe orders has been holding up fairly well.

Sales activity is reported just fair at CLEVELAND and YOUNGSTOWN. Merchant pipe demand has declined from the January level.

A 6-in. pipe line of the Shell Petroleum Corp. from the West, which now ends at Springfield, Ohio, will be extended this spring to Columbus, Ohio, according to Shell officials at Springfield.

At Toledo, Standard Oil Co. of Ohio has been granted city permission to build a 10-in. pipe line through East Toledo to its plant on the bay shore.

MERCHANT BARS

... Sales not gaining noticeably over recent weeks

TOTAL hot-rolled bar sales at PITTSBURGH disclose little or no change from weekly tonnages placed since the latter part of January. Owing to small inventories, there has been a noticeable increase in the number of consumers ordering recently. Cold drawers have been in the market recently and fill-in business from the automobile industry is furnishing a fair measure of support.

At CLEVELAND and YOUNGSTOWN the movement of forging bars has been well sustained recently. Shipments apparently are intended primarily for the automotive industry. Demand for bars from the agricultural implement industry has been consistent in recent weeks, as manufacturers began production of harvesting machinery.

TIN PLATE

... Specifications expected to gain soon ... Operations 52%

TIN plate operations continue at approximately 52 per cent this week with little or no change in the total volume of new business. Sanitary can makers and general line can manufacturers continue their recent practice of hand-to-mouth buying. Since stocks are low, it is confidently expected specifications will slowly increase from now on.

BOLTS, NUTS, RIVETS

... New buying not up to January level

INCOMING volume in virtually all bolt and nut items has fallen below that of January, which was a fairly good month. The lighter demand has not yet forced any deviation from published quotations by the leading producers, however.

SHIPBUILDING

... Bethlehem low on two U. S. Cruisers taking 4800 tons of steel

ABOUT 2400 tons of plates, shapes, bars and sheets will be required for each of the two light cruisers for which bids were opened last Wednesday by the Navy Department, with the Bethlehem Steel Co. submitting the lowest figures.

Bidding on a labor and material cost adjusted basis, the Bethlehem company offered to build one vessel for \$12,898,000 and two vessels for \$11,695,000 each at its Quincy, Mass., shipbuilding yard. The only other bidder was the Federal Shipbuilding & Dry Dock Co., which submitted a fixed price of \$15,950,000 for one vessel and \$14,200,000 each for two. On an adjusted basis the company bid \$14,500,000 for one vessel and \$12,950,000 each for two vessels.

The Bureau of Supplies and Accounts, Navy Department, will open bids March 2 for 8352 tons of steel for the battleship Alabama, building at the Norfolk, Va., Navy yard. The material to be purchased consists of 7375 tons of plates, sheets and strips, 777 tons of shapes and 200 tons of bar and strip steel. On March 9 the bureau will open bids for 600 tons of I-beams for the Alabama.

REINFORCING STEEL

*... Awards of 3100 tons;
13,850 tons in new projects.*

ATLANTIC STATES AWARDS

180 Tons, Newark, N. J., Treasury Department requirements, to Igoe Bros., Jersey City.
100 Tons, Rahway, N. J., high school, to Bethlehem Steel Co., Bethlehem, Pa., through Auf-Der-Heide-Aragona, Inc., contractor.

CENTRAL AND WESTERN STATES

621 Tons, Los Medanos, Cal., Central Valley school, to Judson Steel Co., Oakland, Cal.
500 Tons, Neroly Junction, Cal., Contra Costa pumping plant, Central Valley project (Invitation B47370-A), to Columbia Steel Co., San Francisco.
500 Tons, Fayetteville, Ark., University of Arkansas, to Sheffield Steel Corp., Kansas City, through F. T. Smith, contractor.
250 Tons, Lexington, Neb., power house, to Sheffield Steel Corp., through Ceco Steel Products.
170 Tons, Chicago, Children's Memorial Hospital, to Ceco Steel Products Co., through A. M. Castle & Co., Chicago.
168 Tons, Alameda, Cal., navy shop foundations (Specifications 8609), to Gilmore Fabricators, Inc., San Francisco, through Healy-Tibbits Construction Co., San Francisco.
140 Tons, Davenport, Iowa, Marquette State school, to Ceco Steel Products, Chicago, Steel Corp., Cleveland, through Truscon.
125 Tons, Boone, Iowa, city hall, to Republic Steel Co., Lippert Construction Co., contractor.
110 Tons, Hoisington, Kan., school to Ben Sibbitt Iron & Foundry Co., Wichita, Kan.
101 Tons, Bloomington, Ind., physical science building, to Bethlehem Steel Co., Bethlehem, Pa.
100 Tons, Richmond, Cal., Standard Oil Co. of California laboratories, to Gilmore Fabricators, Inc., San Francisco.
100 Tons, Dubuque, Iowa, Eagle Point Reservoir, to Calumet Steel Co., Chicago, through Anton Zwack Co., contractor.

PENDING STRUCTURAL PROJECTS

ATLANTIC STATES

900 Tons, Ulster, Orange and Dutchess Counties, N. Y., Delaware Aqueduct, contract 318; bids received by Board of Water Supply, New York, until March 2.
380 Tons, Springfield, Mass., Connecticut River flood wall.
150 Tons, Queens, N. Y., mostly mesh, Cross Island Parkway, Hillside Avenue to 91st Street, contract SC-39-3; bids received by Department of Parks until Feb. 24.
115 Tons, Chelsea-Everett, Mass., metropolitan district sewer, sections 102 and 103.

CENTRAL AND WESTERN STATES

3650 Tons, Chicago, section S6, State Street subway; bids in.
3150 Tons, Chicago, section D4, Dearborn Street subway; John Marsch, Inc., low bidder.
700 Tons, San Francisco, junior college science building; bids March 8.
615 Tons, Avon and Martinez, Cal., Pacific Gas & Electric Co. steam plant foundations.
600 Tons, Ottumwa, Iowa, cold storage building, John Morrell Co.; bids Feb. 23.
575 Tons, Columbus, Ohio, North Broadway bridge.
546 Tons, Including 75 tons mesh, Hawthorne, Nev., navy munitions depot; William P. Neil Co., Los Angeles, low on general contract.
500 Tons, Chicago, Western Avenue bridge, Thomas McQueen Co., Chicago, low bidder.
475 Tons, Toledo, Ohio, library.
390 Tons, Sunol, Cal., Calaveras Dam repair; bids March 8.
300 Tons, Steubenville, Ohio, sewers.
288 Tons, Buena, Wash., Bureau of Reclamation (Invitation 33819); bids in.
140 Tons, Tulsa, Okla., warehouse and industrial building.
140 Tons, Muskogee, Okla., warehouse.
105 Tons, Verdi, Nev., bridge; bids Feb. 27.
100 Tons, Toledo, Girls' Trade School. Bids Feb. 24.
Unstated tonnage, Columbus, Ohio, juvenile detention home.
Unstated tonnage, Clinton, Ohio, township bridge.
Unstated tonnage, Columbus, Ohio, civic housing project; bids March 10.

... PIPE LINES ...

New York State Natural Gas Corp., 545 William Penn Way, Pittsburgh, plans welded steel pipe lines in connection with development of new natural gas field in southern part of Steuben County, N. Y., near Woodhull, N. Y., including lines for connection with present system, pipe line gathering system, etc. Several booster stations will be built. Cost over \$80,000. V. F. Bowyer is company engineer.

Plans Pipe Line Corp., Levelland, Tex., subsidiary of Motor Fuels Corp., same place, both organized recently, plans welded steel pipe line from oil field districts in Cochran and Hockley Counties, Tex., to Levelland, about 35 miles, for crude oil transmission to new refinery to be built by parent company at latter place. Pumping stations will be built. Cost over \$100,000. W. D. Richardson is head of both organizations.

United States Engineer Office, Vicksburg, Miss., asks bids until March 3 for 10 sections of 16-in., inside diameter, steel pipe, $\frac{3}{8}$ -in. thick; 60 ft. of 18-in. seamless black steel pipe, and 100 ft. of similar pipe, 17-in. (Circular 172).

Water Department, Tacoma, Wash., W. A. Kunigk, superintendent, will take bids soon for about 7928 ft. of 30-in. steel pipe for new main trunk line in South Sixty-fourth Street, also for approximately 873 ft. of 18-in. and 64 ft. of 16-in., both cast iron, for connecting lines.

Fallbrook Utility District, Fallbrook, Cal., has low bid for welded steel pipe at \$59,522.50 from American Pipe & Steel Co., Alhambra, Cal.

Illinois Pipe Line Co., 4529 West Ogden Street, Chicago, has let contract to White Deer Pipe Line Co., Twenty-ninth Street, S.E., Oklahoma City, for 10-in. welded steel pipe line from oil field district at Sandoval, Ill., to connection with present system, about 40 miles, for crude oil transmission.

Shell Pipe Line Co., Shell Building, St. Louis, affiliated with Shell Petroleum Corp., same address, plans two new welded steel pipe lines from oil refinery to be built by parent company in Denver oil field district, Yoakum County, Tex., for gasoline transmission. One line will extend to Seagraves, Gaines County, Tex., connecting with company loading racks at that place; the other will run to Hobbs, N. M., for company distributing station there. Pumping stations will be installed.

Brown Oil Corp., Calgary, Alta., R. A. Brown, president, and associated oil interests, plan new 12-in. welded steel pipe line from Turner Valley oil field district, Alta., to point near head of Great Lakes, for oil transmission. Line will have rated capacity of about 50,000 bbl. per day, and will include terminal stations, pumping plants for booster service and other operating facilities. Cost estimated in excess of \$20,000,000.

Purchasing Officer, Panama Canal, Washington, asks bid Feb. 27 on 55,360 ft. of pipe.

... CANADA ...

Business Gaining Slowly but Steadily

TORONTO, Feb. 21—New business continues in good volume in the Canadian iron and steel markets and local steel interests state that sales are showing slow but steady improvement. Large railroad contracts are pending.

Mills are taking steel scrap in better tonnage and foundries are pushing dealers for iron scrap. Deliveries from collectors are better and some good tonnages of scrap have entered yards during the past couple of weeks. Prices are unchanged for recently revised levels.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Feb. 21, 1939	Feb. 14, 1939	Jan. 24, 1938	Feb. 21, 1938	1939	1938
Fabricated structural steel awards	13,500	9,100	21,800	12,770	157,100	94,175
Fabricated plate awards	2,555	275	2,175	2,650	28,255	18,715
Steel sheet piling awards	0	0	2,175	210	7,960	3,185
Reinforcing bar awards	3,100	5,825	10,500	8,375	82,895	37,420
Total Letting of Construction Steel ..	19,155	15,200	36,650	24,005	276,210	153,495

Shafting, Hangers, Pillow Blocks and Stringers

(CONCLUDED FROM PAGE 36)

rigid pillow block does not permit of adjustment of the position of the bearing with respect to the base of the block in a vertical plane, although minor lateral adjustments are possible by shifting the position of the base in the slotted bolt holes through which the fastening bolts run. Many pillow blocks and most hangers, however, permit of adjustment of the bearing position in both the vertical and horizontal planes transversely with respect to the shaft.

Pillow blocks are usually used for the support of a heavy shaft running above a floor; hangers are used for lighter shafts supported from the ceiling, from a column, or from a sidewall. In both cases the bearings may be of the babbitt or oilless, smooth contact surface type, or of the so-called anti-friction, ball or roller bearing type.

Adjustment of the position of a pillow block bearing in a vertical plane is usually accomplished by means of two opposing wedges in the base; adjustment of the position of a hanger bearing may be by two or four screws holding the bearing housing within the hanger frame, according as to whether only vertical, or both vertical and horizontal adjustment is desired.

Hangers may be bolted directly to ceiling beams when shafting is to be supported from overhead. When this is done, however, the operation of shifting a line of shafting to a new location to accommodate a new location of driven machines, is an arduous and expensive job. It has come to be a widely accepted practice today to fasten hangers to a system of overhead stringers, in such a way that the stringers may be moved laterally, and the hangers longitudinally, so that individual hangers may be more easily spotted at required points in the ceiling area, to suit a new set-up of driven machines at any time.

In this way a high degree of hanger-location flexibility may be achieved, thus removing one of the curses of lineshaft transmission systems. At first, stringers were used not to secure this flexibility of hanger location, but to avoid the necessity of fastening hangers directly to ceiling beams not located at the points of shafting load. Hence, timber stringers were used, crossing the ceiling beams at right angles. In

such cases the stringers were practically fixed installations, but the hangers could be moved at will along the stringers.

This type of construction has more recently been largely replaced by the structural steel type of stringer grid shown in one of the accompanying illustrations. Here two systems of stringers are used; the upper system fixed to the ceiling beams or other fixed supports, and the lower movably fastened to the upper and running at right angles thereto. The lower stringer may be shifted at will across

the upper stringer system, and the hangers may be shifted at will across the lower stringer. Thus, any hanger may be spotted exactly where it will meet the point of load on the shaft, for any driven machine power take-off.

The stringer construction is uniquely simple. Two channel sections are used, placed back to back but separated sufficiently to permit long bolts to run between the sections. These long bolts support the lower stringer, or the hanger, and when either a stringer or a hanger must be shifted to a new location, the whole operation requires only the loosening of a few nuts on such long bolts, the shifting to the new location, and the tightening of the same bolts in the new position.

GREAT BRITAIN.

... New British defense program a stimulus to steel industry.

LONDON, Feb. 21 — While commercial demand is improving slowly, the Government announcement that it will make an outlay of £580,000,000 on defense has afforded a stimulus to the iron and steel trade. The semi-finished market is especially active and supplies are to be augmented by imports under the Cartel agreement. Light structural and re-rolled steel are moving more freely, but railways and shipbuilding are still idle and constructional steel is quiet.

The pig iron market is dull as exporting is still difficult.

The Continental steel market is still subject to world political influences, but the feeling exists that the chances of maintaining peace are increasing, though the difficulties still ahead are realized.

Japan is making an inquiry for 70,000 tons of various products, proposing to pay cash for 20,000 tons, and the balance by a financial arrangement.

A strong demand for Welsh tin plate pushed unfilled orders to a trifle under 3,000,000 base boxes. Home consumers bought heavily up to end of September. Export sales are fair and inquiries moderate.

United Kingdom imports during January of all kinds of iron and steel amounted to 67,000 tons, of which 8800 tons came from the United

States. Exports of pig iron amounted to 6900 tons; black sheets, 5000 tons; tin plate, 20,500; galvanized sheets, 11,300. Total iron and steel amounted to only 120,000 tons.

Lukens Steel Co. Officials Reelected by Stockholders

AT the annual meeting of the stockholders of Lukens Steel Co. held at Coatesville, Pa., on Feb. 14, all officers of the company were reelected. Robert W. Wolcott is president; Charles L. Huston, first vice-president; F. H. Gordon, vice-president in charge of sales; D. S. Wolcott, vice-president; Stewart Huston, secretary; J. W. Herman, treasurer and assistant secretary. S. H. Hofmann was elected assistant treasurer.

Stockholders also elected five new directors: Charles L. Huston, Jr., Norman R. Entrekin, W. Perry Tyson, John E. McCauley, and Samuel L. Shober, Jr.

Republic Publishes Report for Employees

CLEVELAND — "Republic Reports," a new organ published for its employees by the Republic Steel Corp., has made its first appearance in the company's plants and offices. Printed as a four-page folder, the initial issue carries a front-page editorial declaring that: "The Report will try to give some idea about the immediate future, as far as the company is concerned, and about the prospects for business in general."

NON-FERROUS

... The decline in London prices brings a \$2 cut in lead quotations here . . . Copper trading is very moderate; resale material is slightly higher . . . Prime Western sales total only 1471 tons for the week.

NEW YORK, Feb. 21—A burst of foreign copper buying over the week-end and a cut of \$2 a ton in lead quotations here were the chief features of the non-ferrous market in the past week. The spurt in foreign purchases of the red metal, which had practically no effect on the domestic volume, began on Thursday and reached a peak on Friday when

5300 tons were sold. On Monday buying interest tapered and sales dropped to 2000 tons. This morning the foreign cartel did very little business. The foreign price rose slightly as the turnover increased, but slid off as soon as the demand eased. This morning's foreign sales were made in the neighborhood of 10.06c. per lb., c.i.f., which is practically the same level that pre-

vailed a week ago. Trading in the domestic market continues to drag along, with producers adhering to the 11.25c.-level. Resale prices hardened somewhat with the news of the better cartel bookings, but dropped back to around 10.40c. to 10.45c. as European buying subsided.

Lead

Despite the generally favorable position of the domestic lead market, the extended decline of the London prices, which last week reached the point of theoretically permitting imports, caused sellers to lower quotations \$2 a ton on Thursday to 4.75c. per lb., New York. Consumers, particularly the storage battery and pigment interests, took advantage of the cheaper metal and covered heavily in March positions. As the soft London prices were the direct cause of the change in the domestic level, the trade expects the market to react just as rapidly to any improvement in the London market. On Thursday, the day prices were revised. the London spot price was 2.94c. per lb.; this morning it was 2.98c.

Zinc

Sales of prime Western in the past week totaled only 1471 tons against 2464 in the previous week and 5129 tons three weeks ago. Shipments were also lower, the week's total of 3718 tons comparing with 4248 in the preceding period. On Monday and today occasional carlots were still the rule and prices continued unchanged at 4.89c. per lb., New York. This morning's spot London price was 2.81c., a loss of two points from the price of a week ago.

Tin

Last week was the dullest experienced by tin sellers in a long time. Speculative as well as consumer interest was totally lacking and turnover consisted almost entirely of occasional 5 and 10 ton lots. Prices edged higher during the week in sympathy with the better London values which are currently receiving a good bit of support from the buffer pool stock. Today's Straits price in New York is 45.50c., while on first call in London this morning cash standards were selling at £213 7s. 6d.

Harbison-Walker Refractories Co., Pittsburgh, reports a net income for 1938 of \$736,434, compared with a net profit of \$3,131,595 in 1937. The 1938 income is equivalent to 41c. a share on common stock, compared with \$2.17 a share in 1937.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Feb. 15	Feb. 16	Feb. 17	Feb. 18	Feb. 20	Feb. 21
Copper, Electrolytic ¹	11.25	11.25	11.25	11.25	11.25	11.25
Copper, Lake	11.375	11.375	11.375	11.375	11.375	11.375
Tin, Straits, New York	45.125	45.20	45.375	45.50	45.40	45.40
Zinc, East St. Louis ²	4.50	4.50	4.50	4.50	4.50	4.50
Lead, St. Louis ³	4.70	4.60	4.60	4.60	4.60	4.60

¹ Delivered Conn. Valley, deduct 1/4c. for New York delivery. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Prices

Base per lb., Delivered

	New York Cleveland	
Tin, Straits pig	46.50c.	48.50c.
Copper, Lake	12.25c.	12.375c.
Copper, electro	11.50c.	12.375c.
Copper, castings	11.25c.	11.875c.
*Copper sheets, hot-rolled	19.375c.	19.375c.
*High brass sheets	17.31c.	17.31c.
*Seamless brass tubes	20.06c.	20.06c.
*Seamless copper tubes	19.875c.	19.875c.
*Brass rods	12.62c.	12.62c.
Zinc slabs	6.25c.	7.00c.
Zinc sheets, No. 9 casks	10.50c.	12.10c.
Lead, American pig	5.75c.	5.50c.
Lead, bar	6.275c.	8.25c.
Lead, sheets, cut	8.00c.	8.00c.
Antimony, Asiatic	15.00c.	17.00c.
Alum., virgin, 99 per cent plus	22.50c.	22.50c.
Alum., No. 1 remelt, 98 to 99 per cent	19.50c.	19.50c.
Solder, 1/2 and 1/2	28.25c.	28.50c.
Babbitt metal, commercial grade	21.50c.	20.75c.

* These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3; on brass sheets and rods, 40, and on brass and copper tubes, 25.

Old Metals Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.00c.	8.75c.
Copper, hvy. and wire	7.00c.	7.50c.
Copper, light and bot-toms	6.25c.	6.50c.
Brass, heavy	4.25c.	4.75c.
Brass, light	3.375c.	4.125c.
Hvy. machine compo-sition	6.125c.	7.625c.
No. 1 red brass or com- pos. turnings	4.125c.	4.625c.
No. 1 red brass or com- pos. turnings	5.875c.	6.50c.
Lead, heavy	3.625c.	4.50c.
Cast aluminum	7.00c.	8.25c.
Sheet aluminum	11.75c.	13.25c.
Zinc	2.25c.	3.50c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered; virgin 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt, No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt, New York: Asiatic, 14c. a lb., f.o.b.; American, 11.25c. a lb. QUICK-SILVER, \$90-\$93 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 10.50c. a lb. lcl.

IRON AND STEEL SCRAP

... Chicago market up 50c. on basis of mill sale ... Composite rises 8c. to \$15.08, new high for 1939.

FEb. 21.—The sale of an unstated tonnage of No. 1 steel to a Chicago district mill at \$14.50 has raised the quoted range from \$14 to \$14.50, in place of a flat \$14 last week. With quoted prices on the prime grade unchanged at PITTSBURGH and PHILADELPHIA, THE IRON AGE composite price advances from \$15 to \$15.08, establishing a new high for the year thus far and in fact since Oct. 19, 1937. In that year, however, the high point was \$21.92, reached in March. So far the market has only begun to creep, having declined to \$14.875 from a mid-January high of \$15 and making a gain of only 20½c. in the last two weeks.

Activity is light in most trading districts and prices generally are unchanged. Only the principal items on the CHICAGO list have been strengthened. Chief transaction of the week was the sale of over 5000 tons of No. 2 steel to a St. LOUIS mill, causing an advance in dealer buying prices in that area, anywhere from 25c. to \$1 a ton. In DETROIT, on the other hand, softness is developing in the market, but no price changes can be substantiated thus far.

Pittsburgh

The market continues steady and strong with some brokers paying as high as \$15.75 a ton for No. 1 steel in covering recent orders. A small amount of No. 1 heavy melting was sold into consumption during the past week at \$16 a ton. This grade continues unchanged this week, being quotable at \$15.50 to \$16 a ton. A substantial shortage of No. 1 heavy melting scrap still exists in the district, and keen competition is present among brokers who are attempting to cover on recent business.

Chicago

Heavy melting steel is quoted this week at \$14 to \$14.50 a gross ton on the basis of a mill sale at slightly above \$14.50. Several other grades rose sympathetically, but most of the list remains unchanged. Scrap is still rather difficult to obtain and broker-dealer transactions continue in the range of \$14 to \$14.50.

Philadelphia

Eastern Pennsylvania operations have advanced fractionally, but the outlook is still not sufficiently hopeful that mills are encouraged to engage in new commitments. Releases on old orders are, however, coming through in fair shape, the result being at least some semblance of activity. Furthermore, the situation continues to derive support from a sustained but moderate demand at Port Richmond for export, the No. 1 grade now bringing prices close to \$15 and the No. 2 grade bringing about \$13.75. Demands for

foundry grades are still spotty and in poor volume, but prices show little alteration despite the lack of support.

Cleveland

The market here has settled down quite definitely, in line with easier open-hearth operations. Blast furnace grades continue strong, however, in the face of fair demand. While foundry inventories are down, demand for this kind of scrap is not overly healthy. One mill is reported as insisting on high grade No. 1 against old sales.

Youngstown

Mills have been offered No. 1 heavy melting steel at \$15.50, but these offers have not yet become general enough to warrant downward revision of published quotations. Shipments are still under regulation.

Buffalo

Lack of activity and an absence of important sales still characterize the market. Limitations on shipments remain in force and are expected to continue so until mill operations are increased. No real improvement is looked for before March. Cast scrap is beginning to move again, however. Prices are steady.

St. Louis

Following the purchase of between 5000 and 6000 tons of No. 2 heavy melting steel by an East Side mill, and the prospect of other commitments, the scrap iron market is firm, and dealers have made these advances: Selected heavy melting 25c. a ton; No. 1 heavy melting and steel angle bars, 50c.; No. 2 heavy melting, 75c., and machine shop turnings, \$1. Railroad lists: Chicago, Burlington & Quincy, 2200 tons; Chicago, Rock Island & Pacific, 400 tons. Production: Kokomo, 5; Granite City and Sheffield, 3.

Cincinnati

Old materials are quiet. Bidding for scrap is not very active, dealers apparently marking time to see how steel production moves. Prices are unchanged, but lacking in attraction to holders of available material. Mill buying is meager, although shipments on contracts are steady.

Detroit

A certain softness is apparent in scrap prices in Detroit and upstate. A large automotive list within the last week brought prices substantially at the levels now being quoted, but in some cases locally purchases have been made a few cents lower than quoted prices and upstate price retrenchments have been as great as 50c. per ton, it is rumored. One Detroit broker has lowered his offering price on low phos. plate by 50c. and on new busheling, 25c. This offering price has not yet made sufficient imprint on the local market to determine whether these two items actually are down by the amount stated.

New York

Domestically the market continues dull. About the only open orders are for

some breakable cast for Harrisburg. Export loadings are steady, and what with a free flow of material, broker buying prices are on the weak side, but no change in quoted prices appears warranted.

Boston

Although the field of exporters has narrowed somewhat since the first of the year, current shippers are very anxious to buy material and in a large majority of cases are paying top prices. Just now shipments are being made to Italy, Japan and northern European ports, with Italy the big factor. Some bundled skeleton is moving from here to the Pittsburgh district, for which brokers are paying \$8 to \$8.15 a ton on cars, and steel turnings, prices for which range from \$3.38 a ton on cars to \$4.15, depending on the classification. Nos. 1 and 2 steel are going to Pennsylvania and New England mills just now are not a buying factor. Currently and since Jan. 1 quite a little automobile scrap has been shipped by truck from the Worcester territory to Providence, some of it being reshipped by barge to New York for export, and the remainder going into storage.

Automobile Prices Being Advanced by Dealers In Some Cities

DETROIT—Automobile price increases in the low-priced field were indicated in reports received by THE IRON AGE just before press time. Rumors in Detroit and other localities indicated that substantial increase had been made at some points on Ford and Mercury cars, with increases rumored on Chevrolet and Plymouth. From Buffalo came definite indications that dealers were quoting Ford prices \$40 higher than last week and Mercury prices \$56 higher.

Factory officials denied that any changes had been made but apparently local dealer groups were putting through the increases in delivered price to put them in a better trading position on used cars. It is known definitely that Dodge prices were increased \$10 Monday morning.

There has been nothing in the factory set-up to indicate the necessity for an increase in price. Materials prices have been steady and much steel was bought at low prices last fall and production has been universally higher than was anticipated when new car prices were figured at announcement time.

Indications are that any change in price made locally or nationally will be used by the dealers to draw out more business by offering higher trade-in prices on used cars.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$15.50 to \$16.00
Railroad hvy. mltng.	16.25 to 16.75
No. 2 hvy. mltng. steel.	14.25 to 14.75
Scrap rails	16.50 to 17.00
Rails 3 ft. and under	18.00 to 18.50
Comp. sheet steel	15.50 to 16.00
Hand bundled sheets	14.50 to 15.00
Hvy. steel axle turn.	14.00 to 14.50
Machine shop turn.	10.00 to 10.50
Short shov. turn.	10.50 to 11.00
Mixed bor. & turn.	8.50 to 9.00
Cast iron borings	8.50 to 9.00
Cast iron carwheels	15.00 to 15.50
Hvy. breakable cast.	12.50 to 13.00
No. 1 cupola cast.	15.25 to 15.75
RR. knuckles & cplrs.	17.50 to 18.00
Rail coil & leaf springs	18.00 to 18.50
Rolled steel wheels	18.00 to 18.50
Low phos. billet crops	18.50 to 19.00
Low phos. punchings	17.50 to 18.00
Low phos. plate	17.00 to 17.50

PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$15.00 to \$15.50
No. 2 hvy. mltng. steel.	13.00 to 13.50
Hydraulic bund. new	14.50 to 15.00
Hydraulic bund. old	11.50 to 12.00
Steel rails for rolling	17.00 to 17.50
Cast iron carwheels	16.50 to 17.00
Hvy. breakable cast.	15.50 to 16.00
No. 1 cast	16.50 to 17.00
Stove plate (steel wks.)	13.00 to 13.50
Railroad malleable	15.50 to 16.00
Machine shop turn.	8.50 to 9.00
No. 1 blast furnace	6.50 to 7.00
Cast borings	6.50 to 7.00
Heavy axle turnings	10.00 to 10.50
No. 1 low phos. hvy.	17.00
Couplers & knuckles	17.00
Rolled steel wheels	17.00
Steel axles	20.00 to 20.50
Shafting	20.50 to 21.00
Spec. iron & steel pipe	12.00 to 12.50
No. 1 forge fire	11.00 to 11.50
Cast borings (chem.)	9.50 to 10.00

CHICAGO

Delivered to Chicago district consumers:	
Per Gross Ton	
Hvy. mltng. steel	\$14.00 to \$14.50
Auto. hvy. mltng. steel	
alloy free	12.50 to 13.00
No. 2 auto steel	11.50 to 12.00
Shoveling steel	14.00 to 14.50
Factory bundles	13.00 to 13.50
Dealers' bundles	12.50 to 13.00
Drop forge flashings	10.00 to 10.50
No. 1 busheling	12.50 to 13.00
No. 2 busheling, old	5.75 to 6.25
Rolled carwheels	15.00 to 15.50
Railroad tires, cut	15.00 to 15.50
Railroad leaf springs	15.25 to 15.75
Steel coup. & knuckles	14.50 to 15.00
Axle turnings	12.50 to 13.00
Coil springs	16.00 to 16.50
Axle turn. (elec.)	13.50 to 14.00
Low phos. punchings	15.50 to 16.00
Low phos. plates 12 in. and under	15.00 to 15.50
Cast iron borings	5.25 to 5.75
Short shov. turn.	7.00 to 7.50
Machine shop turn.	6.50 to 7.00
Rerolling rails	16.75 to 17.25
Steel rails under 3 ft.	15.75 to 16.25
Steel rails under 2 ft.	16.25 to 16.75
Angle bars, steel	15.25 to 15.75
Cast iron carwheels	12.25 to 12.75
Railroad malleable	15.00 to 15.50
Agric. malleable	11.25 to 11.75

Per Net Ton	
Iron car axles	\$18.50 to \$19.00
Steel car axles	18.00 to 18.50
Locomotive tires	14.00 to 14.50
Pipes and flues	9.00 to 9.50
No. 1 machinery cast.	12.50 to 13.00
Clean auto. cast.	13.00 to 13.50
No. 1 railroad cast.	11.00 to 11.50
No. 1 agric. cast.	10.25 to 10.75
Stove plate	7.75 to 8.25
Grate bars	9.00 to 9.50
Brake shoes	9.25 to 9.75

YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$15.50 to \$16.00
No. 2 hvy. mltng. steel.	14.25 to 14.75
Low phos. plate	16.00 to 16.50
No. 1 busheling	14.50 to 15.00
Hydraulic bundles	15.00 to 15.50
Machine shop turn.	9.75 to 10.25

CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$14.00 to \$14.50
No. 2 hvy. mltng. steel.	13.00 to 13.50
Comp. sheet steel	13.50 to 14.00
Light bund. stampings	10.75 to 11.25
Drop forge flashings	13.00 to 13.50
Machine shop turn.	7.50 to 8.00
Short shov. turn.	8.00 to 8.50
No. 1 busheling	13.50 to 14.00
Steel axle turnings	11.50 to 12.00
Low phos. billet and bloom crops	18.00 to 18.50
Cast iron borings	8.00 to 8.50
Mixed bor. & turn.	8.00 to 8.50
No. 2 busheling	8.00 to 8.50
No. 1 cupola cast	16.50 to 17.00
Railroad grate bars	9.50 to 10.00
Stove plate	9.50 to 10.00
Rails under 3 ft.	17.75 to 18.25
Rails for rolling	17.00 to 17.50
Railroad malleable	15.50 to 16.00
Cast iron carwheels	14.50 to 15.00

BUFFALO

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$14.00 to \$14.50
No. 2 hvy. mltng. steel.	12.00 to 12.50
Scrap rails	15.00 to 15.50
New hvy. b'ndled sheets	12.00 to 12.50
Old hydraul. bundles	10.75 to 11.25
Drop forge flashings	12.00 to 12.50
No. 1 busheling	12.00 to 12.50
Hvy. axle turnings	10.50 to 11.00
Machine shop turn.	6.50 to 7.00
Knuckles & couplers	16.50 to 17.00
Coil & leaf springs	16.50 to 17.00
Rolled steel wheels	16.00 to 16.50
Low phos. billet crops	15.50 to 16.00
Shov. turnings	8.75 to 9.25
Mixed bor. & turn.	7.50 to 8.00
Cast iron borings	7.50 to 8.00
Steel car axles	16.50 to 17.00
No. 1 machinery cast.	15.00 to 16.00
No. 1 cupola cast	14.50 to 15.00
Stove plate	13.00 to 13.50
Steel rails under 3 ft.	18.00 to 18.50
Cast iron carwheels	13.50 to 14.00
Railroad malleable	15.00 to 15.50
Chemical borings	9.00 to 9.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:	
Selected hvy. melting	\$12.50 to \$13.00
No. 2 hvy. melting	12.50 to 13.00
No. 1 locomotive tires	13.50 to 14.00
Misc. stand. sec. rails	13.75 to 14.25
Railroad springs	15.50 to 16.00
Bundled sheets	7.50 to 8.00
No. 1 busheling	7.50 to 8.00
Cast. bor. & turn.	2.50 to 3.00
Machine shop turn.	4.00 to 4.50
Heavy turnings	10.00 to 10.50
Rails for rolling	16.50 to 17.00
Steel car axles	17.00 to 17.50
No. 1 RR. wrought	10.50 to 11.00
No. 2 RR. wrought	12.25 to 12.75
Steel rails under 3 ft.	16.00 to 16.50
Steel angle bars	15.00 to 15.50
Cast iron carwheels	14.50 to 15.00
No. 1 machinery cast.	14.50 to 15.00
Railroad malleable	12.50 to 13.00
No. 1 railroad cast.	12.50 to 13.00
Stove plate	8.50 to 9.00
Grate bars	9.00 to 9.50
Brake shoes	10.00 to 10.50

CINCINNATI

Dealers' buying prices per gross ton at yards:	
No. 1 hvy. mltng. steel.	\$11.50 to \$12.00
No. 2 hvy. mltng. steel.	11.50 to 12.00
Pipes and flues	9.00 to 9.50
No. 1 machinery cast.	12.50 to 13.00
Clean auto. cast.	13.00 to 13.50
No. 1 railroad cast.	11.00 to 11.50
No. 1 agric. cast.	10.25 to 10.75
Stove plate	7.75 to 8.25
Grate bars	9.00 to 9.50
Brake shoes	9.25 to 9.75
Iron car axles	\$18.50 to \$19.00
Steel car axles	18.00 to 18.50
Locomotive tires	14.00 to 14.50
Pipes and flues	9.00 to 9.50
No. 1 machinery cast.	12.50 to 13.00
Clean auto. cast.	13.00 to 13.50
No. 1 railroad cast.	11.00 to 11.50
No. 1 agric. cast.	10.25 to 10.75
Stove plate	7.75 to 8.25
Grate bars	9.00 to 9.50
Brake shoes	9.25 to 9.75
Drop forge flashings	10.75 to 11.25
Machine shop turn.	5.25 to 5.75
No. 1 busheling	8.00 to 8.50
No. 2 busheling	2.75 to 3.25
Rails for rolling	17.50 to 18.00
No. 1 locomotive tires	14.25 to 14.75
Short rails	18.00 to 18.50
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast.	13.50 to 14.00
No. 1 railroad cast.	12.75 to 13.25
Burnt cast	6.75 to 7.25
Stove plate	6.75 to 7.25
Agric. malleable	11.75 to 12.25
Railroad malleable	14.25 to 14.75
Mixed hvy. east	10.50 to 11.00

BIRMINGHAM

Per gross ton delivered to consumer:	
Hvy. melting steel	\$12.50 to \$14.00
Scrap steel rails	14.50 to 15.00
Short shov. turnings	7.50 to 8.10
Stove plate	9.00 to 10.00
Steel axles	15.00 to 16.00
Iron axles	15.00 to 16.00
No. 1 RR. wrought	10.00
Rails for rolling	16.00 to 16.50
No. 1 cast	14.50
Tramcar wheels	14.00

DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. indus.	\$10.50 to \$11.00
No. 2 hvy. mltng. steel.	9.50 to 10.00
Borings and turnings	5.75 to 6.25
Long turnings	5.50 to 6.00
Short shov. turnings	6.00 to 6.50
No. 1 machinery cast.	12.25 to 12.75
Automotive cast	13.50 to 14.00
Hvy. breakable cast.	9.75 to 10.25
Hydraul. comp. sheets	11.75 to 12.25
Stove plate	8.00 to 8.50
New factory bushel	10.75 to 11.25
Sheet clippings	8.25 to 9.25
Flashings	9.50 to 10.00
Low phos. plate scrap	12.00 to 12.50

NEW YORK

Dealers' buying prices per gross ton on cars:	
No. 1 hvy. mltng. steel.	\$10.50 to \$11.00
No. 2 hvy. mltng. steel.	9.00 to 9.50
Hvy. breakable cast	11.50 to 12.00
No. 1 machinery cast	11.50 to 12.00
No. 2 cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Steel car axles	20.00 to 20.50
Shafting	15.50 to 16.00
No. 1 RR. wrought	11.00 to 11.50
No. 1 wrought long	9.50 to 10.00
Spec. iron & steel pipe	9.00 to 9.50
Rails for rolling	16.00 to 16.50
Clean steel turnings	4.00 to 4.50
Cast borings	3.50 to 4.00
Cast borings (chem.)	

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

(Prices are f.o.b. unless otherwise indicated)

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher. F.o.b. Duluth, billets only, \$2 higher.	Per Gross Ton
Rerolling	\$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.	Per Gross Ton
Open hearth or bessemer	\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	Per Gross Ton
Pittsburgh, Chicago or Cleveland	\$43.00
Worcester, Mass.	45.00
Birmingham	43.00
San Francisco	52.00
Rods over 9/32 in. or 47/64 in. inclusive, \$5 a ton over base.	

SOFT STEEL BARS

Base per Lb.

Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham	2.25c.
Detroit, delivered	2.35c.
Duluth	2.35c.
Philadelphia, delivered	2.57c.
New York	2.59c.
On cars dock Gulf ports	2.60c.
On cars dock Pacific ports	2.85c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.10c.
On cars dock Tex. Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt.	1.90c. to 2.05c.
Detroit, delivered	2.00c. to 2.15c.
On cars dock Tex. Gulf ports	2.25c. to 2.40c.
On cars dock Pacific ports	2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham	1.75c. to 1.90c.
Detroit, delivered	1.85c. to 2.00c.
On cars dock Tex. Gulf ports	2.10c. to 2.25c.
On cars dock Pacific ports	2.35c.
Prices on reinforcing bars have been subject to concessions of \$3 a ton or more from above quotations.	

IRON BARS

Chicago and Terre Haute	2.15c.
Pittsburgh (refined)	3.60c.

COLD FINISHED BARS AND SHAFTING*

Base per Lb

Pittsburgh, Buffalo, Cleveland, Chicago and Gary	2.70c.
Detroit	2.75c.

* In quantities of 10,000 to 19,999 lb.

PLATES

Base per Lb.

Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del.	2.10c.
Philadelphia, del'd	2.15c.
New York, del'd	2.29c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.60c.
Wrought iron plates, P'tg	3.80c.

FLOOR PLATES

Pittsburgh or Chicago	3.35c.
New York, del'd	3.11c.
On cars dock Gulf ports	3.70c.
On cars dock Pacific ports	3.95c.

STRUCTURAL SHAPES

Base per Lb.

Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham	2.10c.
Philadelphia, del'd	2.215c.
New York, del'd	2.27c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

STEEL SHEET PILING

Base per Lb.

Pittsburgh, Chicago or Buffalo	2.40c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	\$40.00
Angle bars, per 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton	\$40.00
Light rails (from rail steel) per gross ton	39.00

Base per Lb.

Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast ports	2.25c.
Track bolts, to steam railroads	4.15c.
Track bolts to jobbers, all sizes (per 100 counts)	65.5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.	
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SHEETS

Hot Rolled

Base per Lb.

Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago	2.15c.
Detroit, delivered	2.25c.
Philadelphia, delivered	2.32c.
Granite City	2.25c.
On cars dock Pacific ports	2.65c.
Wrought iron, Pittsburgh	4.25c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago	3.20c.
Detroit, delivered	3.30c.
Granite City	3.30c.
Philadelphia, delivered	3.52c.
On cars dock Pacific ports	3.30c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham	3.50c.
Philadelphia, del'd	3.67c.
Granite City	3.60c.
On cars dock Pacific ports	4.00c.
Wrought iron Pittsburgh	6.10c.

Electrical Sheets

(F.o.b. Pittsburgh)

Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Special Motor	4.95c.
Special Dynamo	5.65c.
Transformer	6.15c.
Transformer Special	7.15c.
Transformer Extra Special	7.65c.

Silicon Strip in coils—Sheet price plus \$1.00 per sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb

Long Ternes

No. 24 unassorted 8-lb. coating	Per Lb.
f.o.b. Pittsburgh or Gary	3.95c.
F.o.b. cars dock Pacific ports	4.65c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland	3.35c.
Detroit, del'd	3.45c.
Granite City	3.45c.
On cars dock Pacific ports	3.95c.

* Prices effective Nov. 10 on shipments through first quarter of 1939.

TIN MILL PRODUCTS

*Tin Plate

Per Base Box

Standard cokes, Pittsburgh, Chicago and Gary	\$5.90
Standard cokes, Granite City	5.10

through first quarter of 1939.

Special Coated Manufacturing Ternes

Per Base Box

Granite City	\$4.40
Pittsburgh or Gary	4.30

Roofing Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)	
8-lb. coating L.C.	\$12.00
15-lb. coating L.C.	14.00
20-lb. coating L.C.	15.90
25-lb. coating L.C.	16.00
30-lb. coating L.C.	17.25
40-lb. coating L.C.	19.50

Black Plate, 29 gage and lighter

Pittsburgh, Chicago and Gary	3.05c.

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WIRE PRODUCTS

Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

Per Lb.

Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

Base per Keg

Standard wire nails	\$2.15
Coated nails	2.45
Cut nails, carloads	3.60

Base per 100 Lb.

Annealed fence wire	\$2.95
Galvanized fence wire	3.35
Polished staples	3.15
Galvanized staples	3.40
Twisted barbless wire	3.30
Woven wire fence, base column	.67
Single loop bale ties, base col.	.56

Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool	\$2.62
Hog wire, per 80 rod spool	\$.28.00

Note: Birmingham base same on above items, except spring wire.

Add \$4 a ton for Mobile, Ala.; \$5 for New Orleans; \$6 for Lake Charles to above bases, except on galvanized and annealed merchant fence wire, which are \$1 a ton additional in each case.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

In.	Black	Galv.	In.	Black	Galv.
1/8	56	36	1/4 & %	.9 + 9	+ 30
1/2 to 3/8	59	43 1/2	1/2	24	6 1/2
1/2	63 1/2	54	3/4	30	13
3/4	66 1/2	58	1 & 1/4	34	19
1 to 3	68 1/2	60 1/2	1 1/2	38	21 1/2
			2	37 1/2	21

Lap Weld

2	61	52 1/2	2	30 1/2	15
2 1/2 & 3	64	55 1/2	2 1/2 to 3 1/2	31 1/2	17 1/2
3 1/2 to 6	66	57 1/2	4	33 1/2	21
7 & 8	65	55 1/2	4 1/2 to 8	32 1/2	20
9 & 10	64 1/2	55	9 to 12	28 1/2	15
11 & 12	63 1/2	54			

Butt weld, extra strong, plain ends

1/8	54 1/2	41 1/2	1/4 & %	.10 + 10	+ 43
1/2 to 3/8	56 1/2	45 1/2	1/2	25	9
1/2	61 1/2	53 1/2	3/4	31	15
3/4	65 1/2	57 1/2	1 to 2	38	22 1/2
1 to 3	67	60			

Lap weld, extra strong, plain ends

2	59	51 1/2	2	33 1/2	18 1/2
2 1/2 & 3	63	55 1/2	2 1/2 to 4	39 1/2	25 1/2
3 1/2 to 6	66 1/2	59	4 1/2 to 6	37 1/2	24
7 & 8	65 1/2	56	7 & 8	38 1/2	24 1/2
9 & 10	64 1/2	55	9 to 12	32	20 1/2
11 & 12	63 1/2	54			

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless	Lap
	Cold	Hot
	Drawn	Rolled

1 in. o.d.	13 B.W.G.	\$ 9.01	\$ 7.82	....
1 1/2 in. o.d.	13 B.W.G.	10.67	9.26	....
1 1/2 in. o.d.	13 B.W.G.	11.79	10.23	29.72
1 1/2 in. o.d.	13 B.W.G.	13.42	11.64	11.06
2 in. o.d.	13 B.W.G.	15.03	13.04	12.33
2 1/2 in. o.d.	13 B.W.G.	16.76	14.54	13.79
2 1/2 in. o.d.	12 B.W.G.	18.45	16.01	15.16
2 1/2 in. o.d.	12 B.W.G.	20.21	17.54	16.58
2 1/2 in. o.d.	12 B.W.G.	21.42	18.59	17.54
3 in. o.d.	12 B.W.G.	22.48	19.50	18.35
3 1/2 in. o.d.	12 B.W.G.	23.37	24.62	23.15
4 in. o.d.	10 B.W.G.	35.20	30.54	28.66
4 1/2 in. o.d.	10 B.W.G.	43.04	37.35	35.22
5 in. o.d.	9 B.W.G.	54.01	46.87	44.25
6 in. o.d.	7 B.W.G.	82.98	71.96	68.14

Extras for less carload quantities:
40,000 lb. or ft. over.....Base
30,000 lb. or ft. to 39,999 lb. or ft.....5%
20,000 lb. or ft. to 29,999 lb. or ft.....10%

10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	\$51.00
6-in. and larger, del'd New York	49.00
6-in. and larger, Birmingham	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	52.00
4-in. f.o.b. dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
4-in. f.o.b. dock, Seattle	52.00

Class "A" and gas pipe, \$3 extra
4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$42, Birmingham, and \$50 delivered Chicago and 4-in. pipe, \$45, Birmingham, and \$54 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:

1/2 in. & 6 in. and smaller 65, 5 and 5*

Larger and longer up to

1 in. 60, 10 and 5*

1 1/2 in. and larger 60, 5 and 5*

Lag bolts 60, 10 and 5*

Plow bolts, Nos. 1, 2, 3 and 7 65, 5 and 5

Hot pressed nuts, and c.p.c. and t nuts, square or hex.

blank or tapped:

1/2 in. and smaller 65 and 5

9/16 in. to 1 in. inclusive 60, 5 and 5

1 1/4 in. and larger 60 and 5

In full container lots, 10 per cent additional discount.

Stove bolts in packages, nuts attached

Stove bolts in packages, with nuts separate

Stove bolts in bulk 85

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets (1/2-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham \$3.40

Small Rivets (7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 65 and 10

Cap and Set Screws

(Freight allowed to destination)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller 50 and 10

Milled square head set screws, case hardened, 1 in. dia. and smaller 73 and 10

Milled headless set screws, cut thread 1 in. and smaller 68 and 10

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller 65 and 10

Upset set screws, cup and oval points 73 and 10

Milled studs 57 and 10

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.

Base price, \$56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base 2.80c.

Delivered, Detroit 2.90c.

S.A.E. Alloy

Series Diferent

Numbers per 100 Lb.

200 (1/2% Nickel) \$0.35

2100 (1 1/2% Nickel) \$0.75

2300 (3 1/2% Nickel) 1.55

2500 (5% Nickel) 2.25

3100 Nickel-chromium 0.70

3200 Nickel-chromium 1.85

3300 Nickel-chromium 3.80

3400 Nickel-chromium 3.20

4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum) 0.55

4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum) 0.75

4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.) 1.10

5100 Chrome steel (0.60-0.90 Cr.) 0.35

5100 Chrome steel (0.80-1.10 Cr.) 0.45

5100 Chromium spring steel 0.15

6100 Chromium-vanadium bar 1.20

6100 Chromium-vanadium spring steel 0.85

Chromium-nickel vanadium 1.50

Carbon-vanadium 0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.40c. base per lb. Delivered Detroit, 3.50c., carlots

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb. f.o.b. Pittsburgh)

Chrome-Nickel

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$22.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	22.00
Delivered Brooklyn	24.50
Delivered Newark or Jersey City	23.53
Delivered Philadelphia	22.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	21.00
F.o.b. Buffalo	21.00
F.o.b. Detroit	21.00
Southern, delivered Cincinnati	21.06
Northern, delivered, Cincinnati	21.44
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	19.00
Delivered, San Francisco, Los Angeles or Seattle	24.50
F.o.b. Birmingham*	17.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	\$22.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	20.50
Delivered Philadelphia	22.34
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Buffalo	\$22.00
F.o.b. Everett, Mass.	23.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Newark or Jersey City	24.53
Erie, Pa., and Duluth	22.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	21.50
F.o.b. Birmingham	22.00
Delivered Cincinnati	22.11
Delivered Canton, Ohio	22.89
Delivered Mansfield, Ohio	23.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.

Gray Forge
Valley or Pittsburgh furnace...\$20.50

Charcoal

Lake Superior furnace...\$25.00
Delivered Chicago.....28.34

Canadian Pig Iron

Delivered Toronto	Per Gross Ton
No. 1 fdy., sll. 2.25 to 2.75.....\$26.50	
No. 2 fdy., sll. 1.75 to 2.25.....25.50	
Malleable.....26.00	
Basic.....25.50	
Delivered Montreal	
No. 1 fdy., sll. 2.25 to 2.75.....\$27.50	
No. 2 fdy., sll. 1.75 to 2.25.....27.00	
Malleable.....27.50	
Basic.....27.00	

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....\$80.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$28.00

Domestic, 26 to 28%.....33.00

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk).....\$69.50*

50% (ton lots in 50 gal. bbl.).....80.50*

75% (carload lots, bulk).....126.00*

75% (ton lots in 50 gal. bbl.).....133.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio Per Gross Ton

10.00 to 10.50%.....\$30.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, \$1 per ton additional. Phosphorus 0.75% or over, \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 500 to 5.50%.....\$24.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton. The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon.....10.50c.*

2% carbon.....16.50c.*

1% carbon.....17.50c.*

0.10% carbon.....19.50c.*

0.06 carbon.....20.00c.*

Silico-manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon.....\$83.00

2.50% carbon.....88.00

2% carbon.....93.00

1% carbon.....103.00

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads.....\$1.75

Ferrotungsten, 100 lbs. and less.....2.00

Ferovanadium, contract, per lb. contained V, delivered.....\$2.70 to \$2.90†

Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., tons lots.....\$2.25†

Ferrocobaltitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton.....\$142.50

Ferrocobaltitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....\$157.50

Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$8 unitage, freight equalized with Rockdale, Tenn., per gross ton.....\$58.50

Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$8 unitage, freight equalized with Nashville.....\$75.00

Ferromolybdenum, per lb. Mo. f.o.b. furnace.....95c.

Calcium molybdate, per lb. Mo. f.o.b. furnace.....80c.

* Spot prices are \$5 per ton higher.

† Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores

Delivered Lower Lake Ports Per Gross Ton

Old range, Bessemer, 51.50%.....\$5.25

Old range, non-Bessemer, 51.50%.....5.10

Messabi, Bessemer, 51.50%.....5.10

Messabi, non-Bessemer, 51.50%.....4.95

High phosphorus, 51.50%.....4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria.....12c.

Iron, low phos., Swedish, average, 68½% iron.....12c.

Iron, basic or foundry, Swedish, aver., 65% iron.....11c.

Iron, basic or foundry, Russian, aver., 65% iron.....Nominal

Man., Caucasian, washed 52%.....30c.

Man., African, Indian, 44-48%.....28c.

Man., African, Indian, 49-51%.....30c.

Man., Brazilian, 46 to 48½%.....27c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered.....\$19.50

Tungsten, domestic, scheelite delivered.....\$17.00 to \$18.00

Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton:

ton: South African (low grade).....\$15.00

Rhodesian, 45%.....19.00

Rhodesian, 48%.....23.00

Turkish, 48-49%.....23.00

Turkish, 45-46%.....19.00

Turkish, 40-44%.....16.00

Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:

50%.....\$24.00

48-49%.....22.50

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail.....\$17.00 to \$18.00

Domestic, f.o.b. Ohio River landing barges.....18.00

No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines.....18.00

Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid.....24.50

Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines.....31.50

FUEL OIL

Per Gal.

No. 2, f.o.b. Bayonne.....4.00c.

No. 6, f.o.b. Bayonne.....2.26c.

No. 5 Bur. Stds., del'd Chicago.....3.25c.

No. 6 Bur. Stds., del'd Chicago.....2.75c.

No. 3 distillate, del'd Cleve'd.....5.50c.

No. 4 industrial, del'd Cleve'd.....5.25c.

No. 5 industrial, del'd Cleve'd.....3.00c.

No. 6 industrial, del'd Cleve'd.....2.75c.

COKE

Per Net Ton

Furnace, f.o.b. Connells-ville, Prompt.....\$3.75

Furnace, f.o.b. Connells-ville, Prompt.....\$4.75 to 5.50

Foundry, by-product, Chicago ovens.....10.25

Foundry, by-product, del'd New England.....12.50

Foundry, by-product, del'd Newark or Jersey City.....10.88 to 11.40

Foundry, by-product, Philadelphia.....10.95

Foundry, by-product, delivered Cleveland.....10.30

Foundry, by-product, delivered Cincinnati.....9.75

Foundry, by-product, Birmingham.....7.50

Foundry, by-product, del'd St. Louis Industrial district.....10.75 to 11.00

Foundry, from Birmingham, f.o.b. cars dock Pacific ports.....14.75

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

Base per Lb.

Plates	3.55c.
Shapes	3.55c.
Soft steel bars and small shapes	3.50c.
Reinforcing steel bars	2.70c.
Cold finished bars and screw stock	3.95c.
Hot rolled strip	3.75c.
Hot rolled sheets	3.50c.
Galv. sheets (24 ga.) 500 lb. to 1499 lb.	4.50c.
Wire, black, soft annealed	3.15c.
Wire, galv., soft	3.55c.
Track spikes $\frac{1}{2}$ in. and smaller (1 to 24 kegs)	3.40c.
Wire nails (in 100-lb. kegs)	2.65c.

On plates, structural, bars, strip and hot rolled sheets, base applied to orders of 400 to 1999 lb.

On reinforcing bars base applies to orders of less than one ton and includes switching and carting charge.

All above prices for delivery within the Pittsburgh switching district.

NEW YORK

Base per Lb.

Plates, $\frac{1}{4}$ in. and heavier	3.76c.
Structural shapes	3.75c.
Soft steel bars, round	3.94c.
Iron bars, Swed. char-coal	7.50 to 8.25c.
Cold-fin, shafting and screw stock:	
Rounds, squares, hexagons	4.39c.
Flats up to 12 in. wide	4.39c.
Cold-rolled strip, soft and quarter hard	3.66c.
Hot-rolled strip, soft O.H.	4.11c.
Hot-rolled sheets (10 ga.)	3.73c.
Galv. sheets (24 ga.)	4.50c.
Long ternes (24 ga.)	5.50 to 6.20c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.90c.
Deep drawing	5.15c.
Stretcher leveled	5.50c.
SAE, 2300, hot-rolled	7.50c.
SAE, 3100, hot-rolled	6.10c.
SAE, 6100, hot-rolled annealed	10.25c.
SAE, 2300, cold-rolled	8.69c.
SAE, 3100, cold-rolled, annealed	7.29c.
Floor plate, $\frac{1}{8}$ in. and heavier	5.43c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.65c.
Wire, galv. (No. 9)	5.00c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, per keg in 25 keg lots	\$2.90

CHICAGO

Base per Lb.

Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.60c.
Soft steel squares, hexagons, channels and Tees	3.75c.
Hot rolled strip	3.75c.
Floor plates	5.15c.
Hot rolled sheets	3.50c.
Galvanized sheets	4.50c.
Cold rolled sheets	4.45c.
Cold finished carbon bars	4.05c.

Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.

CLEVELAND

Base per Lb.

Plates	3.55c.
Structural shapes	3.73c.
Soft steel bars	3.50c.
Reinfor. bars (under 2000 lb.) [†]	2.55c.
Cold-fin. bars (1000 lb. over)	4.05c.
Hot-rolled strip	3.65c.
Cold rolled sheets	4.70c.
Cold finished strip	3.35c.
Galvanized sheets (No. 24)	4.62c.
Hot-rolled sheets	3.50c.
Floor plates, $\frac{1}{16}$ in. and heavier	5.33c.
*Black ann'l'd wire, per 100 lb.	\$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.60
Hot rolled alloy steel (3100)	6.05c.
Cold rolled alloy steel (3115)	6.85c.

* For 5000 lb. or less.

† 500 lb. base quantity.

Prices shown on hot rolled bars, strip, sheets, shapes and plates are for 400 to 1999 lb. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb.; cold rolled sheets, 399 lb. and under.

ST. LOUIS

Base per Lb.

Plates and structural shapes	3.32c.
Bars, soft steel (rounds and flats)	3.87c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.02c.
Cold fin. rounds, shafting, screw stock	4.32c.
Galv. sheets (24 ga.)	4.77c.
Hot rolled sheets	3.77c.
Galv. corrugated sheets, 24 ga. and heavier*	4.82c.
Structural rivets	5.02c.

* No. 26 and lighter take special prices.

BOSTON

Base per Lb.

Structural shapes, 3 in. and larger	5.85c.
Plates, $\frac{1}{4}$ in. and heavier	3.85c.
Bars	3.98c.
Heavy hot rolled sheets	3.86c.
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.76c.
Galvanized sheets	4.76c.
Cold rolled sheets	4.93c.

The following quantity differentials apply: Less than 100 lb., plus \$1.50 per 100 lb.; 100 to 399 lb., plus 50c.; 400 to 1999 lb. base; 2000 to 9999 lb. minus 20c.; 10,000 to 39,999 lb. minus 30c.; 40,000 lb. and over minus 40c.

BUFFALO

Base per Lb.

Plates	3.77c.
Floor plates	5.40c.
Struc. shapes	3.55c.
Soft steel bars	3.60c.
Reinforcing bars (20,000 lb. or more)	2.05c.
Cold-fin. flats, squares, rounds, and hex.	4.05c.
Hot-rolled sheets, $\frac{1}{16}$ x 14 in. to 48 in. wide incl. also sizes	
No. 8 to 30 ga.	3.50c.
Galv. sheets (24 ga.)	4.50c.
Bands and hoops	3.97c.

NEW ORLEANS

Base per Lb.

Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	60

REFRACTORIES PRICES

Fire Clay Brick

Per 1000 f.o.b. Works

Super-duty brick, at St. Louis	\$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1, Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	\$40.00
Chicago District	49.00

Birmingham

Silica cement per net ton (Eastern)

8.55

Chrome Brick

Net per Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester	\$67.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

Net per Ton

Imported, f.o.b. Baltimore and Chester, Pa. (In sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00

Domestic, f.o.b. Chewelah, Wash. (In bulk)	22.00
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PHILADELPHIA

Base per Lb.

Plates, $\frac{1}{4}$ -in. and heavier	3.40c.
Structural shapes	3.40c.
Soft steel bars, small shapes, iron bars (except bands)	3.60c.
Reinforced steel bars, square and deformed	2.81c.
Cold-finished steel bars	4.36c.
Steel hoops	4.10c.
Steel bands, No. 12 and 3/16 in. incl.	3.60c.
Spring steel	4.75c.
Hot-rolled annealed sheets	3.40c.
Galvanized sheets (No. 24)	4.33c.
Diam. pat. floor plates, $\frac{1}{4}$ in.	5.00c.

These prices are for delivery in Philadelphia trucking area.

Base prices subject to deduction on orders aggregating 4000 lb. or over

† For 25 bundles or over.

‡ For one to five tons.

BIRMINGHAM

Bars and bar shapes	\$3.85 base
Structural shapes and plates	3.75 "
Hot rolled sheets	3.80 "
No. 10 ga.	3.80 "
No. 24 ga.	4.40 " 3500 lb. and over

Galvanized sheets

 No. 24 ga. 5.05 " 3500 lb. or more

Strip 4.05 "

Reinforcing bars 3.85 "

Floor plates 5.96 "

Cold finished bars 4.91 "

Machine and carriage bolts 50 & 10 off list

Rivets (structural) \$4.60 base

On plates, shapes, bars, hot-rolled strip heavy hot-rolled sheets, the base applies on 400 to 3999 lb. All prices are f.o.b. consumer's plant.

PACIFIC COAST

Base per Lb.

	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.00c.	4.00c.	4.05c.
Shapes, standard	4.00c.	4.00c.	4.05c.
Soft steel bars	4.05c.	4.00c.	4.30c.
Reinforcing bars, f.o.b. cars dock			
Pacific ports	2.675c.	open	2.975c.
Hot-rolled sheets (No. 10)	4.00c.	4.20c.	3.95c.
Galv. sheets (No. 24 and lighter)	5.15c.	5.05c.	5.25c.
Galv. sheets (No. 22 and heavier)	5.40c.	5.05c.	5.25c.
Cold-finished steel			
Rounds	6.55c.	6.60c.	7.10c.
Squares and hexagons	7.80c.	7.85c.	7.10c.
Flats	8.30c.	8.35c.	8.10c.
Common wire nails—base per keg less carload	\$3.20	\$3.05	\$3.00

All items subject to differentials for quantity.

ST. PAUL

Base per Lb.

Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c.
Galvanized sheets, No. 24	5.00c.

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, has let general contract to Lee Construction Co., 422 South Church Street, Charlotte, N. C., for new buildings and remodeling and modernization of existing structures at plant site, Georgetown, S. C., where company recently acquired about 72-acre tract with buildings. New plant will produce sulphate of alumina and allied specialties. Cost over \$400,000 with equipment. Additional units will be built later.

Carack Co., Inc., 22 West Nineteenth Street, New York, manufacturer of electric lamps and lighting fixtures, has leased about 50,000 sq. ft. in building at Bush Terminal, Third Avenue, near Thirty-fourth Street, Brooklyn, for plant.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until March 10 for cable, end couplings, clamps, etc. (Circular 176).

American Can Co., 230 Park Avenue, New York, has arranged financing in amount of \$10,000,000, through sale of bond issue, part of fund to be used for expansion, including plant extensions in Chicago district and in plants for milk container division.

Royal Typewriter Co., 2 Park Avenue, New York, has let general contract to J. W. Ross Co., 1405 Pell Street, Montreal, for new three-story and basement plant on Park Avenue, Montreal, for Canadian subsidiary. Royal Typewriter Co., Ltd., 731 Bourget Street, Montreal, for parts production and assembling. Cost close to \$150,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 28 for 1440 corrosion-resisting steel buckets with covers, each 12-qt. capacity (Schedule 5567); until March 3, hexagon steel nuts (Schedule 5611), parts for storage battery testing outfit (Schedule 5552) for Brooklyn Navy Yard; until Feb. 28, cast bronze pipe and tubing fittings (Schedule 5590) for Brooklyn and Philadelphia yards; until March 3, 9000 ft. of insulated electric cable (Schedule 5541) for Brooklyn and Mare Island yards.

Quartermaster, West Point, N. Y., asks bids until Feb. 27 for armored cable, circuit breaker, etc. (Circular 1052-92); until Feb. 28, wrought iron pipe, galvanized wrought iron pipe, bushings, pipe fittings, unions, six galvanized tanks, 12 galvanized storage tanks for water heaters, heater parts, etc. (Circular 1052-93).

Reliance Steel Corp., Kingsland Avenue, Lyndhurst, N. J., steel sheets, strips, etc., has leased local one-story building, about 22,500 sq. ft. of floor space, owned by Lackawanna Railroad, for storage and distributing plant for metropolitan area for its Century Division.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Feb. 28 for 1440 hacksaw blades (Circular 582); until March 1, one stacking machine for 10, 12, 14 and 16-in. propellant charges (Circular 555).

Andrew Jergens Co., 2535 Spring Grove Avenue, Cincinnati, soaps, etc., has engaged Tietig & Lee, 34 West Sixth Street, Cincinnati, architects, to prepare plans for new plant on Mill Street, Belleville, N. J., where company is acquiring about 38-acre tract, heretofore held by Belleville Copper Rolling Mills. Cost close to \$1,000,000 with equipment.

Supply Officer, Naval Aircraft Factory, Philadelphia, asks bids until Feb. 28 for 1182 lb. of aluminum alloy tubing (S. & A. Req. 6015-2784).

Bowers Battery Mfg. Co., Reading, Pa., manufacturer of electric storage batteries and parts, is considering one-story addition to plant at Spring Valley, near Reading. Cost over \$50,000 with equipment.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Feb. 27 for instrument department gages (Circular 754); until Feb. 28, one motor-driven single surface wood planer (Circular 750); until March 1, geared-head turret lathe, 1-in. bar capacity (Circular 755); one optical dividing head (Circular 756).

◀ NEW ENGLAND ▶

East Hartford Iron Works, 368 Governor Street, East Hartford, Conn., iron and steel products, has acquired site on Main Street, about 125 x 140 ft., and plans new one-story works. Cost close to \$50,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 7 for alloy steel forgings (Schedule 5635); until March 10, three hacksaw machines (Schedule 5654) for naval station, Newport, R. I.; until March 17, engine lathes, with equipment and electrical spare parts (Schedule 5657) for Boston, Charleston and Puget Sound Navy yards.

Air Conditioning Engineering Co., 61 Rogers Street, Boston, has leased a floor in building at 100 Charles River Road for manufacturing plant.

Rising Paper Co., Housatonic, Mass., bond and other writing papers, has asked bids on general contract for two-story mill addition, 35 x 200 ft. Cost over \$80,000 with equipment.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Feb. 27 for high-speed steel end mills, hollow mills, reamers, cutters, etc. (Circular 296); until Feb. 28, one vertical, single-spindle hand-feed drill press (Circular 298), three motor-driven automatic milling machines (Circular 301); until March 3, one special burring machine for notch-cutting (Circular 286).

◀ BUFFALO DISTRICT ▶

W. F. Hirschman Co., Inc., Jackson Building, Buffalo, manufacturer of mechanical fans, blowers, ventilators, etc., with plant at LeRoy, N. Y., has purchased two-story building at 259 East 134th Street, New York, for new factory branch, storage and distributing plant.

Hooker Electrochemical Co., Buffalo Avenue and Forty-seventh Street, Niagara Falls, N. Y., manufacturer of industrial chemicals, will take bids soon on general contract for one-story addition. Cost over \$85,000 with equipment. W. Alban Cannon, 2637 Main Street, is architect.

McCarthy Brothers & Ford, 75 West Mohawk Street, Buffalo, electrical equipment and supplies, will award general contract soon for two-story addition for storage and distribution. Cost close to \$50,000 with equipment.

◀ WASHINGTON DIST. ▶

Bureau of Yards and Docks, Navy Department, Washington, asks bids until March 1 for condensers, air ejectors, condensate pumps and auxiliary equipment for Pearl Harbor, T. H., Navy Yard (Specifications 9072); until March 15, 38 electric overhead traveling bridge cranes for navy yards at Boston, New York, Philadelphia, Norfolk, Mare Island, and Puget Sound (Specifications 9111).

Julien P. Friez & Sons, Division of Bendix Aviation Corp., 4 North Central Avenue, Baltimore, manufacturers of aeronautical and other scientific instruments and parts, have acquired about 18 acres on Joppa Road, Towson, for new plant. Main unit will be one-story, 80 x 400 ft., with wing extension, 100 x 100 ft., and several smaller structures. When completed, present works will be removed to new

location and capacity increased. Cost close to \$500,000 with machinery.

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Feb. 27 for 70,000 brass buckles, 920 gross of brass clinch tips (Circular 254); until March 6, 38 motor-driven blower units, with motor mounted on cast iron base (Circular 267).

Commanding Officer, Ordnance Department, Aberdeen Proving Grounds, Aberdeen, Md., asks bids until Feb. 27 for screws, steel cotter pins, hose clamps, switches and other equipment (Circular 64).

Town Council, Easton, Md., asks bids until Feb. 27 for cable and other equipment for extensions and improvements in municipal electrical distribution system. E. G. Kastenhuber is town engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 28 for light and power wire (Schedule 5619) for Sewall's Point, Va., yard; until March 7, one traveling wheel-type grinder (Schedule 5642) for Carderock, Md.; motor-driven knife grinder (Schedule 5613), steel bolts, nuts and lag bolts (Schedule 5622), brass and steel bolts and nuts (Schedule 5620), machine screws and nuts, and wood screws (Schedule 5627) for Eastern and Western Navy yards; until March 10, 200 nickel-copper alloy forgings (Schedule 5666) for Washington yard.

◀ SOUTH ATLANTIC ▶

United States Engineer Office, Jacksonville, Fla., asks bids until Feb. 28 for one electric generator unit and auxiliary equipment (Circular 321).

City Council, Atlanta, Ga., Lloyd A. Walker, city purchasing agent, asks bids until Feb. 27 for steam turbine-driven centrifugal pumping equipment and accessories for installation in Hemphill pumping station, to have daily rating of 40,000,000 gal., with piping and miscellaneous equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 3 for one electric low-lift industrial truck for Charleston, S. C. (Schedule 5624).

◀ SOUTH CENTRAL ▶

Joseph E. Seagram & Sons Co., Seventh Street Road, Louisville, distiller, has let general contract to F. W. Owens Co., 119 North Fifth Street, for extensions and improvements in local distillery. Cost close to \$45,000 with equipment.

United States Engineer Office, Vicksburg, Miss., asks bids until Feb. 27 for two diesel engine-driven crawler-type tractors, with bulldozer (Circular 170); until March 2, 19,200 ft. high-grade plow steel wire rope (Circular 171); until March 3, one forged steel impeller shaft, one forged steel cutter shaft and one forged steel line shaft (Circular 173).

Fayette County Board of Education, Lexington, Ky., plans remodeling a building at Pickadome High School for a new trade and vocational school. Cost about \$75,000. John T. Gillig, Radio Building, is architect.

Smith Baking Co., Meridian, Miss., plans extensions and improvements, including installation of ovens, mixers, conveyors and other mechanical equipment. Cost about \$50,000.

◀ SOUTHWEST ▶

Shell Petroleum Corp., Shell Building, St. Louis, is considering new gasoline refinery in Denver oil field area, Yoakum County, Tex., with power house, pumping station, steel tank storage division and other facilities. Cost close to \$500,000 with equipment.

Board of Education, Library Building, Kansas City, Mo., George C. Tinker, secretary, has asked bids on general contract for two-story and basement shop building, 44 x 95 ft., at R. T. Coles Vocational and Junior High School, 1835 Tracy Avenue. Cost over \$80,000 with equipment. Nate W. Downes, Finance Building, is architect and engineer.

Alma Farmers' Elevator Co., Inc., Alma (Lafayette County), Mo., Albert Kiehl, president, plans grain elevator and terminal on

Missouri River at Waverly, Mo., where site has been secured. It will consist of several units, with elevating, conveying, loading and other mechanical-handling facilities. Cost over \$85,000.

Verdigris River Hydro-Electric, Inc., Catoosa, Okla., Carl Matthews, manager, plans new hydroelectric generating plant on Verdigris River, near Wagoner, Okla. Project will include power dam 75 ft. high and 4000 ft. long, generating station with initial capacity of 10,000-kw., transmission and distributing lines, power substations and other structures. Cost close to \$2,000,000.

Link-Belt Co., Chicago, and 413 Second Street, Dallas, Tex., has purchased tract at Latimer, Bourbon and Eureka Streets, Dallas, for new two-story factory branch, storage and distributing plant. Cost close to \$100,000 with equipment.

Motor Fuels Corp., Levelland, Tex., recently organized, has acquired local tract for new oil refinery for production of gasoline and other motor oils, with cracking division, steel storage and distribution facilities, power house, pumping station and other structures. Cost about \$200,000 with machinery. W. D. Richardson, formerly vice-president of Cosden Petroleum Corp., Houston, Tex., is president.

◀ WESTERN PA. DIST. ▶

Westinghouse Electric & Mfg. Co., East Pittsburgh, plans one-story factory branch, storage and distributing plant on Tenth Street, Fairmont, W. Va., 80 x 130 ft. Cost over \$50,000 with equipment. Superstructure will begin in March.

United States Engineer Office, Huntington, W. Va., asks bids until Feb. 27 for two continuous, straight tapered steel flagpoles (Circular 223).

Pennsylvania Railroad Co., Pennsylvania Terminal, Pittsburgh, has approved plans for construction of new engine house and shops at repair yards in East End district, Oil City, Pa., to replace buildings destroyed by fire several weeks ago. Cost about \$185,000 with equipment. W. B. Wood, first noted address, is chief engineer.

◀ OHIO AND INDIANA ▶

William Powell Co., 2511 Spring Grove Avenue, Cincinnati, manufacturer of valves and other engineering specialties, has let general contract to Ferro Concrete Construction Co., Third and Elm Streets, for one-story addition, 70 x 120 ft. Cost over \$75,000 with equipment. Tietig & Lee, 34 West Sixth Street, are architect.

Herman Falter Packing Co., 278 Greenlawn Avenue, Columbus, Ohio, meat packer, has let general contract to Leo Ruisinger, 851 Frebis Avenue, for one-story addition, 52 x 75 ft., for storage and distribution. Cost close to \$40,000 with equipment.

Contracting Officer, Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Feb. 27 for five electric power plants and one to five automatic control systems (Circular 679), installation parts (Circular 666); until Feb. 28, floodlight lamp assemblies (Circular 687), 125 floodlight lenses and four sets of molds for fabrication (Circular 709); until March 1, 30 hydraulic hand pump assemblies (Circular 673); until March 8, 45 heavy-duty tractors and 16 tractor-mowers (Circular 696).

Quartermaster, Patterson Field, Fairfield, Ohio, asks bids until March 1 for one clamshell bucket (Circular 305-10).

Farnsworth Television & Radio Corp., 127 East Mermaid Lane, Philadelphia, recently organized to succeed Farnsworth Television, Inc., same address, is concluding negotiations for acquisition of plant of General Household & Utilities Corp., Marion, Ind., manufacturer of radio apparatus, and for business and plant of Capehart, Inc., Fort Wayne, Ind., manufacturer of custom-built radios and talking machines. Both plants will be occupied by purchasing company, which will increase output and install additional equipment for production of television and radio sets and

equipment. Farnsworth company is arranging for sale of stock to total about \$600,000, considerable part of proceeds to be used for purchase and purposes noted.

◀ MICHIGAN DISTRICT ▶

L. A. Young Spring & Wire Corp., 9200 Russell Street, Detroit, has arranged for lease of one-story building, 113 x 300 ft., for new branch plant, to be erected by Clearing Industrial District, 6455 South Central Avenue, Chicago, at Sixty-sixth Place and Oak Park Avenue, Chicago. Cost close to \$100,000 with equipment. John S. Cromeline is architect for Clearing Industrial District, address noted.

King-Seely Corp., Detroit Avenue, Ann Arbor, Mich., manufacturer of oil gages, fuel pumps and other measuring equipment, has asked bids on general contract for one-story addition for expansion in parts production and assembling divisions. Cost close to \$100,000 with equipment. Giffels & Vallet, Inc., Marquette Building, Detroit, is architect and engineer.

Pressed Metals of America, Inc., Port Huron, Mich., manufacturer of screw machine products, is arranging sale of stock issue to total about \$500,000, part of proceeds to be used for expansion and improvements in equipment and facilities.

◀ MIDDLE WEST ▶

Swift & Co., Oil Mill Division, Union Stock Yards, Chicago, has acquired tract at East Euclid and Delaware Avenues, Des Moines, Iowa, for new soybean oil mill. It will consist of one and multi-story units for processing division, storage and distributing buildings, power house, machine shop and other structures. Cost close to \$300,000 with machinery.

Ruda Co., 2306 South Kedzie Avenue, Chicago, manufacturer of metal door and window frames, etc., has purchased a two-story and basement building on site, 124 x 125 ft., at 2117-27 South Troy Street, and will remodel for plant. Plans are under way for a one-story and basement addition to existing structure. Company works will be removed to new location and capacity increased. Cost over \$45,000 with equipment.

Archer-Daniels-Midland Co., 109 South Seventh Street, Minneapolis, Minn., manufacturer of linseed oil and kindred products, has let general contract to McKenzie-Hague Co., Corn Exchange Building, for new mill at Decatur, Ill., where tract was purchased recently. It will consist of several units for soybean processing, 190 x 615 ft., with smaller structures. Cost over \$1,000,000 with equipment.

Bureau of Reclamation, Denver, asks bids until March 3 for one 28 x 15-ft. radial gate for headworks (Proposal 1192-D); until March 6, one 10-ton two-motor traveling crane (Specifications 1193-D); until March 8, one crawler traction mounted revolving dragline excavator, diesel powered, with 60-ft. boom, and a 20-ft. insertion piece and other accessories (Specifications 1194-D).

Construction Machinery Co., Glenwood and Vinton Streets, Waterloo, Iowa, manufacturer of contractors' machinery, hoists, pumps, etc., has let general contract to Charles Mauser, 2303 West Fourth Street, for one-story addition, and improvements in present plant. Cost close to \$40,000 with equipment.

United States Engineer Office, Fort Peck, Mont., asks bids until Feb. 27 for wire cloth, acetylene gages, oxygen gages and other equipment (Circular 229).

Board of Public Works, Lockport, Ill., plans large pumping station for new sewage disposal plant and will begin work early in spring. Fund of \$1,000 has been arranged for entire project. Edwin Hancock, 1509 West Jackson Boulevard, Chicago, is consulting engineer.

Board of Vocational Education, La Crosse, Wis., has placed general contract with Robert Regan Co., 228 North La Salle Street, Chicago, for building \$75,000 addition and making alterations in vocational institute. John B. Coleman is director of school.

Kenosha, Wis., H. C. Laughlin, city manager, will take bids about March 8 for new sewage treatment plant, to cost about \$900,000, as PWA project. Alvord, Burdick & Howson, 20 North Wacker Drive, Chicago, are consulting engineers.

Meili-Blumberg Corp., New Holstein, Wis., has placed general contract with Schuman Construction Co., Kohler, Wis., for machine shop, 60 x 100 ft., one-story and part basement. E. A. Stubenrauch, 809 North Eighth Street, Sheboygan, Wis., is architect.

Board of Vocational Education, Green Bay, Wis., has accepted bid of E. H. Regal Construction Co., 136 South Adams Street, on general contract for additions to and alterations in vocational school to cost \$125,000. H. O. Eiken is director of school.

◀ PACIFIC COAST ▶

Board of Education, Riverside, Cal., will take bids soon on general contract for one-story vocational shop at Chemawa junior high school. Cost about \$80,000 with equipment. Financing has been arranged through Federal aid. G. Stanley Wilson, 3616 Main Street, is architect.

Coca-Cola Co., 963 East Fourth Street, Los Angeles, has low bid from P. J. Walker Co., 3900 Whiteside Avenue, for three-story and basement addition, 120 x 120 ft., to beverage and mechanical-bottling plant, including modernizing an existing three-story and basement building, 80 x 120 ft. Cost close to \$225,000 with machinery. W. P. Weisiger, first noted address, is resident engineer in charge.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 7 for motor-driven centrifugal pumps and spare parts and tools (Schedule 5493), 45,000 ft. of single-conductor, heat and flame-resistant cable (Schedule 5618); until March 14, one tank-cleaning equipment (Schedule 5631) for Mare Island Navy Yard; until Feb. 28, two electric battery trucks, tilting, telescoping, fork-type (Schedule 5621) for San Diego Naval Air Station.

Board of Education, 1151 South Broadway, Los Angeles, has approved plans for one-story and basement vocational shop at Belmont High School, 1575 West Second Street. Cost about \$80,000 with equipment. A. S. Nibecker, Jr., address noted, is architect for board.

Pontoon Bridge Builders, Inc., 2929 Sixteenth Street, S.W., Seattle, plans new graving docks and wharf at waterfront property at 2745 Sixteenth Street, S.W. Cost about \$100,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, has let general contract to James I. Barnes Construction Co., Santa Monica, Cal., for superstructure for new assembly and repair shop at naval air station, Alameda, Cal., at \$788,200, exclusive of tools and equipment (Specifications 9033).

Constructing Quartermaster, Fort Mason, Cal., asks bids until Feb. 27 for 35,500 ft. of cable, 12,000 ft. of wire, cable racks, hooks for cable racks, ground rods, junction boxes and other equipment (Circular 6615-55).

◀ FOREIGN ▶

Tata Sons, Ltd., Bombay, India, manufacturer of heavy industrial chemicals, commercial fertilizers, etc., plans new works, comprising several one-story units, with power house, machine shop and other mechanical departments. Cost over \$700,000 with equipment.

Cariboo-Hudson Gold Mines, Ltd., Vancouver, B. C., operating gold-mining properties, is disposing of about \$100,000 stock issue, proceeds to be used for purchase of mining machinery and power equipment.

Canadian Car & Foundry Co., Ltd., 621 Craig Street West, Montreal, plans expansion in two local plants on Tucot Street and at Point St. Charles respectively, consisting of additional one-story units and improvements in certain existing structures, for increased production in aircraft division. Cost over \$250,000 with machinery.

THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

... General industrial sources buying in the East, added to substantial aircraft business . . . Cincinnati builders report large foreign bookings.

Substantial Foreign Orders Placed in Past Week

CINCINNATI—Closing of several foreign contracts the past week pushed machinery demand up a few points to above the halfway level. While domestic ordering is still about on an even keel, this heavy contracting for export has widened the disparity between the two considerably. Manufacturers decline to disclose exact quantities but indicate multiple unit orders were placed for shipment to Russia, England, France and Japan, with smaller demand for other countries.

The small tool predominance is still strong with lathes, grinders and millers competing for the lead. Drilling machinery is lagging, while planers, boring mills, shapers and brakes reflect steady buying interest.

Aircraft Industry Places Orders With Cleveland Firms

CLEVELAND—The aircraft industry continues to supply considerable impetus for producers and dealers. A local aircraft parts manufacturer has ordered several lathes and a miller, while an Eastern manufacturer has placed about two dozen lathes. Recent sales in this vicinity include three lathes for a local electrical plant, two radial drills, grinders and other equipment for a press manufacturer, and a lathe for a steel mill. While the automotive industry has been comparatively quiet, one motor car company has purchased several lathes, and single machines are understood to be up with others.

Automobile Makers Place 1940 Model Die Work

DETROIT—Tool and die work for 1940 model automobiles is being placed with Detroit and outside shops at a steady rate now, but with indications that the forthcoming season will be a slow one. Additional equipment will be purchased soon for the branch plant of Fisher Body Corp. at Grand Rapids, where approximately 50 per cent is being added to the floor space of the stamping plant. The plant and equipment are expected to cost approximately \$1,000,000.

International Harvester Still Chief Factor in Mid-West

CHICAGO—In conjunction with its large program of machine tool purchasing for many of its plants, the International Harvester Co. is also surveying its various machine shops for equipment

worth rebuilding. It will thus be unnecessary for this company to buy a considerable number of new machines, since it is finding much equipment that, with a few repairs, will be satisfactory. The optimism of Chicago sellers, born of increased orders and inquiries since Feb. 1, continues little altered. Small tool orders

are increasing in size individually, which is an indication not only of greater activity, but also of greater confidence. Other than the Harvester company, few buyers are interested in more than one machine at a time.

General Industry Entering The Eastern Market

NEW YORK—For the first time this year and, in fact, in well over a year general industrial plants are represented among buyers of machine tools in this area. This miscellaneous volume added to the active purchases of aircraft and other concerns with Government contracts, plus the Army and Navy proper, will probably make the month's totals substantial for a number of sellers. The local market for machinery is still spotty, however, to the extent that not all selling factors are sharing in the general improvement.

Steel Industry to Spend \$126,000,000 For New Equipment in 1939

APPROXIMATELY \$126,000,000 will be spent by steel companies during 1939 for new construction and equipment, according to reports received by the American Iron and Steel Institute from 150 companies representing more than 90 per cent of the capacity of the industry.

The industry's proposed expenditures for new equipment this year raise the total spent or to be spent for such purposes since 1934 to nearly one billion dollars. The amount budgeted for 1939 is less than was spent in any of the preceding four years, and represents a decline of about 25 per cent from 1938, when \$165,000,000 was budgeted.

In addition to the expansion programs covered in their estimates for 1939, however, a number of companies indicated that certain additional projects now under consideration might be started in 1939 if the business outlook improves sufficiently.

The prospective decline in new equipment and construction expenditures this year reflects not only the generally unprofitable level of steel operations last year, but also the fact that most of the major plant expansion programs which have been in progress during the past several years have now been completed or are nearing completion.

In 1935 the steel industry's expenditures for new equipment and construction amounted to \$140,000,000. In the following year such expenditures increased to a total of \$216,000,000. In

1937 the amount was \$320,000,000. In 1938, actual expenditures were \$140,000,000.

Modernization of existing equipment is the principal item of the industry's construction program for 1939. No new continuous hot sheet mills, blast furnaces or steel furnaces are reported under construction.

Scrap Dealers Consider Problem of No. 2 Bundles

CLEVELAND—A committee of Cleveland scrap dealers will be set up to study the problem of No. 2 bundles, it was decided at a meeting here Feb. 15 after discussion of ways for insuring consumers' confidence in that type of scrap.

The meeting of the Northern Ohio chapter of the Institute of Scrap Iron and Steel, Inc., was addressed by J. E. Jacobson, Pittsburgh, national president of the institute; E. C. Barringer, secretary, and Meyer Singer, president of the Pittsburgh chapter.

Mr. Barringer introduced the problem of No. 2 bundles and emphasized the importance of lighter scrap grades, pointing to the marked shrinkage in the proportion of No. 1 steel to No. 2 grades.

Plans also were discussed for the mid-year meeting of the institute here Sept. 11 and 12. Approximately 100 persons attended the dinner meeting at the Carter Hotel, Cleveland.